UltraTech
Group of Labs

Ultratech's Accreditations:

ANSI American National Standards Institute
0685

31040/SIT

C-1376

Canada
46390-2049

NVLAP
200093-0

BSMI
SL2-IN-E-1119R

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May 01, 2006

TIMCO ENGINEERING INC.
P.O. Box 370
849 N.W. State Road 45
Newberry, Florida
USA 32669

Subject: Certification Application under FCC Part 15, Subpart C, Para. 15.249, Low Power Transmitters Operating in the Frequency Band 902-928 MHz.

Applicant: Gecko Electronics Inc.
Product: Buoyant Operating Spa System (B.O.S.S.)
Model: in.k707
FCC ID: PTT-INK707

Dear Sir/Madam,

As appointed agent for **Gecko Electronics Inc.**, we would like to submit this application for FCC Certification of the above product. Please review all necessary files uploaded to TIMCO Upload site.

If you have any queries, please do not hesitate to contact us.

Yours truly,

Tri Minh Luu, P. Eng.,
V.P., Engineering

TML/AK

Encl.

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May 01, 2006

Gecko Electronics Inc.
450 des Cenetons
Quebec, Quebec
Canada, G2E 5W6

Attn.: **Mr. Jean Bizouard**

Subject: **Certification Application under FCC Part 15, Subpart C, Para. 15.249, Low Power Transmitters Operating in the Frequency Band 902-928 MHz.**

Product: **Buoyant Operating Spa System (B.O.S.S.)**
Model: **in.k707**
FCC ID: **PTT-INK707**

Dear Mr. Bizouard,

The product sample, as provided by you, has been tested and found to comply with **FCC Part 15, Subpart C, Para. 15.249, Low Power Transmitters operating in the Frequency Band 902-928 MHz.**

Please feel to contact us if you have any further questions.

Best Regards,

Tri M. Luu, P.Eng.
V.P. Engineering

ENGINEERING TEST REPORT

Buoyant Operating Spa System (B.O.S.S.)
MODEL NO.: in.k707

FCC ID: PTT-INK707

Applicant: **Gecko Electronics Inc.**
450 des Cenetons
Quebec, Quebec
Canada, G2E 5W6

Tested in Accordance With

FCC PART 15, SUBPART C, PARA. 15.249
LOW POWER TRANSMITTERS
OPERATING IN THE FREQUENCY BAND FROM 902 - 928 MHz

UltraTech's File No.: GEK-012FCC15C

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs Date: May 01, 2006	
Report Prepared by: Mr. Tri M. Luu Issued Date: May 01, 2006	Tested by: Mr. Hung Trinh Test Dates: April 26, 2006

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
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TABLE OF CONTENTS

EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C, Section 15.249
Title	Telecommunication - Code of Federal Regulations, CFR 47, Part 15
Purpose of Test:	To gain FCC Certification Authorization for Low Power Licensed-Exempt Transmitters operating in the Frequency Band 902 - 928 MHz .
Test Procedures	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	Residential Light-industry, Commercial Industry

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None

1.3. NORMATIVE REFERENCES

Publication	YEAR	Title
FCC CFR Parts 0-19	2006	Code of Federal Regulations – Telecommunication
ANSI C63.4	2004	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
FCC Public Notice DA 00-1407	2000	Part 15 Unlicensed Modular Transmitter Approval
CISPR 22 +A1 EN 55022	2003-04-10 2004-10-14 2003	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
CISPR 16-1-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-2-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-1: Conducted disturbance measurement
CISPR 16-2-3	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-3: Radiated disturbance measurement

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT:	
Name:	Gecko Electronics Inc.
Address:	450 des Cenetons Quebec, Quebec Canada, G2E 5W6
Contact Person:	Mr. Jean Bizouard Phone #: (418) 872 4411 x 151 Fax #: 418-872-0920 Email Address: jbizouard@gecko-electronic.com

MANUFACTURER:	
Name:	Gecko Electronics Inc.
Address:	450 des Cenetons Quebec, Quebec Canada, G2E 5W6
Contact Person:	Mr. Jean Bizouard Phone #: (418) 872 4411 x 151 Fax #: 418-872-0920 Email Address: jbizouard@gecko-electronic.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name	Gecko Electronics Inc.
Product Name	Buoyant Operating Spa System (B.O.S.S.)
Model Name or Number	in.k707
Serial Number	pre-production
Type of Equipment	Spa remote Control
Input Power Supply Type	3 x AAA NiMH batteries
Primary User Functions of EUT:	Wireless Remote Control

2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Portable
Intended Operating Environment:	Residential Commercial, light industry & heavy industry
Power Supply Requirement:	Battery powered, 3xAAA NiMH rechargeable batteries, no contact
E-Field at 3 meters	89.7 dBµV/m (QP)
Operating Frequency Range:	915-917 MHz
RF Output Impedance:	50 Ohms
Channel Spacing:	1
Duty Cycle:	100%
26 dB Bandwidth:	156.31 kHz
Modulation Type:	FSK, 64 kHz deviation
Emission Designation:	156KF1D
Antenna Connector Type:	Integral, permanently attached
Antenna Description:	Manufacturer: Linx Type: Helix Model: HM-916 Frequency Range: 900-920 MHz Gain: unknown, estimated +6 dBi

2.4. LIST OF EUT'S PORTS

N/A

2.5. ANCILLARY EQUIPMENT

N/A

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	Battery powered, 3xAAA NiMH rechargeable batteries, no contact

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The transmitter was set to transmit continuously during testing
Special Test Software:	N/A
Special Hardware Used:	N/A
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as an integral antenna equipment.

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Powerline Conducted Emissions were performed in UltraTech's shielded room, 16'(L) by 12'(W) by 12'(H).

- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049-1). Last Date of Site Calibration: June. 20, 2005.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC PARAGRAPH.	TEST REQUIREMENTS	COMPLIANCE (YES/NO)
15.107(a) & 15.207	AC Power Conducted Emissions	N/A for battery powered device
	26 dB Bandwidth	Yes
15.249(a), 15.209, 15.205	Transmitter Radiated Emissions, Harmonic Emissions	Yes

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in ANSI C63.4 and ULTR-P001-2004.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document LAB 34 with a confidence level of 95%. Please refer to Exhibit 6 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED:

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CISPR 16-1.

5.4. 26 DB BANDWIDTH

5.4.1. LIMITS

No limit is required. Test is performed form informrtion only.

5.4.2. METHOD OF MEASUREMENTS

Refer to ANSI C63.4

The transmitter output was connected to the spectrum analyzer through an attenuator. the bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW = 1% of approximate 26dB BW, VBW > RBW, Span = approx. 3x26dB BW. The 26 dB Bandwidth was measured and recorded.

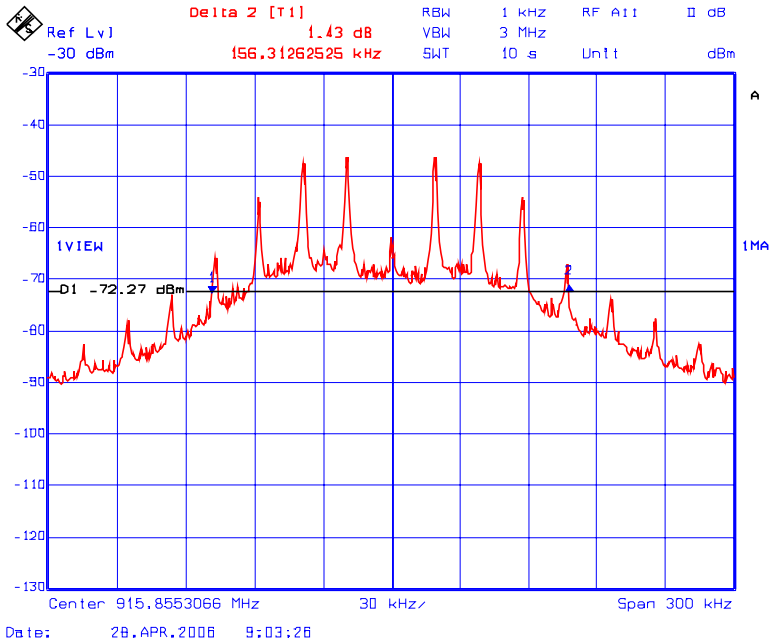
5.4.3. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Rohde & Schawrz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz with external mixer

5.4.3.1. Test Data

CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (KHz)
915.86	156.31

Plot #2: 26 dB Bandwidth



5.5. TRANSMITTER SPURIOUS EMISSIONS (RADIATED @ 3 METERS), FCC CFR 47, PARA. 15.249(A), 15.209 & 15.205

5.5.1. LIMITS

- The Field Strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

FUNDAMENTAL FREQUENCY (MHz)	FIELD STRENGTH LIMIT @3m OF FUNDMENTAL (mV/m)	FIELD STRENGTH LIMIT @ 3m OF HARMONICS (µV/m)
902 - 928	50	500

- The fundamental frequency shall not fall within any restricted frequency band specified in 15.205 All rf other emissions that fall in the restricted bands shall not exceed the general radiated emission limits specified in @ 15.209(a).

FCC CFR 47, Part 15, Subpart C, Para. 15.205(a) - Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	162.0125 - 167.17	2310 - 2390	9.3 - 9.5
0.49 – 0.51	167.72 - 173.2	2483.5 - 2500	10.6 - 12.7
2.1735 - 2.1905	240 - 285	2655 - 2900	13.25 - 13.4
8.362 - 8.366	322 - 335.4	3260 - 3267	14.47 - 14.5
13.36 - 13.41	399.9 - 410	3332 - 3339	14.35 - 16.2
25.5 – 25.67	608 - 614	3345.8 - 3358	17.7 - 21.4
37.5 – 38.25	960 - 1240	3600 - 4400	22.01 - 23.12
73 - 75.4	1300 - 1427	4500 - 5250	23.6 - 24.0
108 – 121.94	1435 - 1626.5	5350 - 5460	31.2 - 31.8
123 – 138	1660 - 1710	7250 - 7750	36.43 - 36.5
149.9 – 150.05	1718.8 - 1722.2	8025 - 8500	Above 38.6
156.7 – 156.9	2200 - 2300	9000 - 9200	

FCC CFR 47, Part 15, Subpart C, Para. 15.209(a)
-- Field Strength Limits within Restricted Frequency Bands --

FREQUENCY (MHz)	FIELD STRENGTH LIMITS (µV/m)	DISTANCE (Meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / F (KHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

5.5.2. METHOD OF MEASUREMENTS

Refer to Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods

5.5.3. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Rohde & Schawrz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz with external mixer
Microwave Amplifier	Hewlett Packard	HP 83017A		1 GHz to 26.5 GHz
Active Loop Antenna	EMCO	6507	8906-1167	1 kHz – 30 MHz
Biconilog Antenna	EMCO	3143	1029	20 MHz to 2 GHz
Horn Antenna	EMCO	3155	9701-5061	1 GHz – 18 GHz

5.5.4. TEST DATA

FREQUENCY (MHz)	PEAK E-FIELD @3m (dBuV/m)	QP E-FIELD @3m (dBuV/m)	ANTENNA PLANE (V/H)	AVERAGE LIMIT @3m (dBuV/m)	Pass/Fail Margin (dB)	MARGIN (Pass/Fail)
915.85	88.1	87.0	V	94.0	-7.0	PASS
915.85	90.1	89.7	H	94.0	-4.3	PASS
1831.70	49.4	45.3	V	54.0	-8.7	PASS
1831.70	48.3	43.9	H	54.0	-10.1	PASS
2747.55	48.3	40.3	V	54.0	-13.7	PASS
2747.55	49.1	42.7	H	54.0	-11.3	PASS
3663.40	51.0	39.4	V	54.0	-14.6	PASS
4579.25	49.0	34.3	H	54.0	-19.7	PASS

- The emissions were scanned from 30 MHz to 10 GHz and all emissions within 20 dB below the limits were recorded.
- Highest measurements were recorded when the transmitter was tested with 3 different orthogonal positions as shown in Photos # 1 to 3 in Annex 1.

Plot # 2:

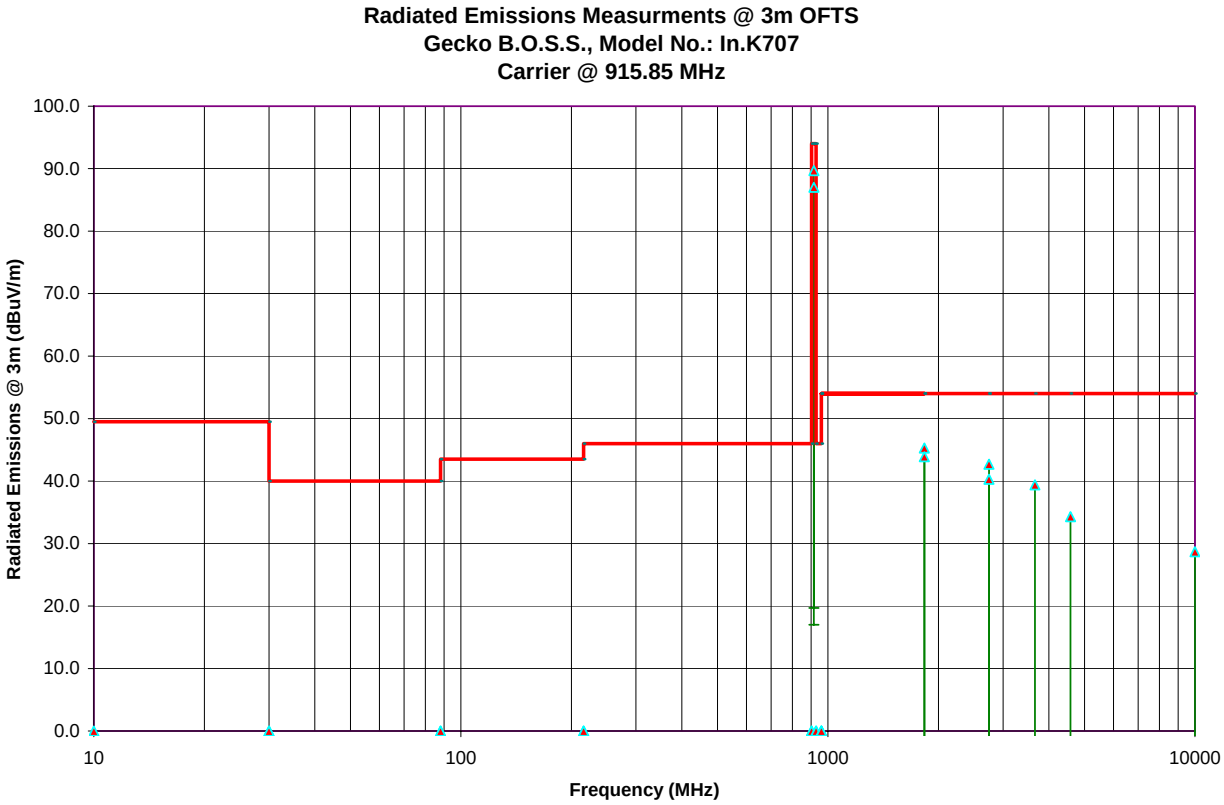


EXHIBIT 6. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and LAB 34

6.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Line Conducted)	PROBABILITY DISTRIBUTION	UNCERTAINTY (dB)	
		9-150 kHz	0.15-30 MHz
EMI Receiver specification	Rectangular	±1.5	±1.5
LISN coupling specification	Rectangular	±1.5	±1.5
Cable and Input Transient Limiter calibration	Normal (k=2)	±0.3	±0.5
Mismatch: Receiver VRC Γ_1 = 0.03 LISN VRC Γ_R = 0.8(9 kHz) 0.2 (30 MHz) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	U-Shaped	±0.2	±0.3
System repeatability	Std. deviation	±0.2	±0.05
Repeatability of EUT	--	--	--
Combined standard uncertainty	Normal	±1.25	±1.30
Expanded uncertainty U	Normal (k=2)	±2.50	±2.60

Sample Calculation for Measurement Accuracy in 450 kHz to 30 MHz Band:

$u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)} = \pm \sqrt{(1.5^2 + 1.5^2)/3 + (0.5/2)^2 + (0.05/2)^2 + 0.35^2} = \pm 1.30$ dB

$U = 2u_c(y) = \pm 2.6$ dB

6.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	UNCERTAINTY (± dB)	
		3 m	10 m
Antenna Factor Calibration	Normal (k=2)	±1.0	±1.0
Cable Loss Calibration	Normal (k=2)	±0.3	±0.5
EMI Receiver specification	Rectangular	±1.5	±1.5
Antenna Directivity	Rectangular	+0.5	+0.5
Antenna factor variation with height	Rectangular	±2.0	±0.5
Antenna phase center variation	Rectangular	0.0	±0.2
Antenna factor frequency interpolation	Rectangular	±0.25	±0.25
Measurement distance variation	Rectangular	±0.6	±0.4
Site imperfections	Rectangular	±2.0	±2.0
Mismatch: Receiver VRC $\Gamma_1 = 0.2$ Antenna VRC $\Gamma_R = 0.67$(Bi) 0.3 (Lp) Uncertainty limits $20\text{Log}(1\pm\Gamma_1\Gamma_R)$	U-Shaped	+1.1 -1.25	±0.5
System repeatability	Std. Deviation	±0.5	±0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 3m biconical antenna including a factor of k=2 is used:

$U = 2u_c(y) = 2x(+2.19) = +4.38$ dB And $U = 2u_c(y) = 2x(-2.21) = -4.42$ dB