

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

PDA pool/spa wireless remote controller transceiver box

MODEL No.: 8252

Brand Name: Jandy

FCC ID: S8F8252

REPORT NO: SZE06071211332R

ISSUE DATE: July 29, 2006

Prepared for

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VERIFICATION OF COMPLIANCE

Applicant:	Laar, Inc., dba Waterpik Technologies Pool Products&Heating Systems. 6000 Condor Drive, Moorpark, CA93021, USA
Manufacturer:	Providence Enterprise Ltd. Rm 613-615, Grand City Plaza, No.1 Sai Lau Kok Rd. Tsuen Wan, Hong Kong
Product Description:	PDA pool/spa wireless remote controller transceiver box
Brand Name:	Jandy
Model Number:	8252
Serial Number:	N/A
File Number:	SZE06071211332R
Date of Test:	July 18, 2006 ~ July 28, 2006

We hereby certify that:

The EUT was assessed by Centre Testing International 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 (2003) 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 15.249.

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

Approved By



*Jimmy Zhang / Lab. Director
Centre Testing International (CTI)*

Table of Contents

1.	GENERAL INFORMATION.....	4
1.1	PRODUCT DESCRIPTION	4
1.2	RELATED SUBMITTAL(S) / GRANT (S).....	4
1.3	TEST METHODOLOGY.....	4
1.4	TEST FACILITY	4
2.	System Test Configuration	5
2.1	EUT CONFIGURATION.....	5
2.2	EUT EXERCISE.....	5
2.3	TEST PROCEDURE.....	5
2.4	LIMITATION.....	5
2.5	CONFIGURATION OF TESTED SYSTEM.....	7
3.	Summary Of Test Results.....	9
4.	Description of test modes.....	9
5.	Conducted Emissions Test	10
5.1	MEASUREMENT PROCEDURE:	10
5.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	10
5.3	MEASUREMENT EQUIPMENT USED:	10
5.4	MEASUREMENT RESULT:	10
5.5	CONDUCTED MEASUREMENT PHOTOS:.....	11
6.	RADIATED EMISSION TEST.....	12
6.1	MEASUREMENT PROCEDURE.....	12
6.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	13
6.3	MEASUREMENT EQUIPMENT USED:	14
6.4	FIELD STRENGTH CALCULATION	14
6.5	MEASUREMENT RESULT.....	15
6.6	MEASUREMENT RESULT.....	17
7.	OCCUPIED BANDWIDTH	18
7.1	MEASUREMENT PROCEDURE.....	18
7.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	18
7.3	MEASUREMENT EQUIPMENT USED.....	18
7.4	MEASUREMENT RESULTS.....	19
APPENDIX 1		
PHOTOGRAPHS OF SET UP.....		20
APPENDIX 2		
PHOTOGRAPHS OF EUT.....		20

1. GENERAL INFORMATION

1.1 Product Description

The EUT is PDA pool/spa wireless remote controller transceiver box, the transmission signal is frequency of operation in the range of 902-928MHz. The modulation used is FSK with 10KHz Deviation

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 915.3 MHz ~ 923.7 MHz
- B). Modulation: FSK
- C). Antenna Designation: Integral
- D). Power Supply: 12 Vdc

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for Calss II permissive change to FCC ID: S8F8252 filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on No. 6, Jinao industrial park, No.35 Jukeng Road, Dashuikeng Village, Guanlan Town, Baoan District, Shenzhen, China. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table 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 mode**.

2.3.2 Radiated Emissions

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

2.4 Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB(uV)	
	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

Note

1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

(2) Radiated Emission

- a. The field strength of fundamental emission within this band (section 15.249 frequency between 902MHz –928MHz) shall not exceed 50 millivolts/meter at 3 meters. (93.98dB μ V/m at 3m) and the Harmonics emission shall not exceed 500 microvolts/meter at 3 meters.(53.98 dB μ V/m at 3m) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.
- b. The field strength of any emissions which appear in the restricted band shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit).as below.

Frequency (MHz)	Field strength μ V/m	Distance(m)	Field strength at 3m dB μ V/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in dB μ V/m=20 log (uV/m)
 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205
 4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ 15.205, then the general radiated emission limits in ξ 15.209 apply.

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

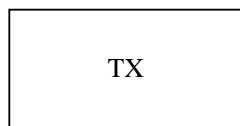


Fig. 2-2 Configuration of Tested System

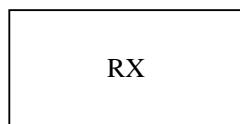


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	PDA pool/spa wireless remote controller transceiver box	Jandy	8252	S8F8252	N/A	EUT

Summary Of Test Results

FCC Rules	Description Of Test	Result
§ 15.207	Conducted Emission	N/A
§ 15.249	Radiated Emission	Compliant

1. Description of test modes

1. The EUT (PDA pool/spa wireless remote controller transceiver box) has been tested under condition of TX and RX individually
2. The EUT stays in continuous transmitting or receiving mode when performing individual test. The top frequency and the bottom frequency has been evaluated at each mode

Conducted Emissions Test (Not Applicable)

5.1 Measurement Procedure:

1. The EUT powered by adapter 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.

5.2 Test SET-UP (Block Diagram of Configuration)

N/A

5.3 Measurement Equipment Used:

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI 30	N/A	06/07/2006	06/06/2007
Spectrum Analyzer	ADVANTEST	R3132	120901472	06/07/2006	06/06/2007
LISN	EMCO	3825/2	1371	02/26/2006	02/25/2007
LISN	EMCO	3825/2	8901-1459	02/26/2006	02/25/2007

5.4 Measurement Result:

(The chart below shows the highest readings taken from the final data)

FREQ MHz	PEAK dBuV	Q.P. Raw dBuV	AVG Raw dBuV	Q.P. Limit dBuV	Avg Limit dBuV	Q.P. Margin dB	Avg Margin dB	NOTE
								L1
								L1
								L1
								L1
								L1
								L1
								L2
								L2
								L2
								L2
								L2

L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

**NOTE: “---” denotes the emission level was or more than 2dB below the Average limit,
so no re-check anymore.

5.5 Conducted Measurement Photos:

N/A

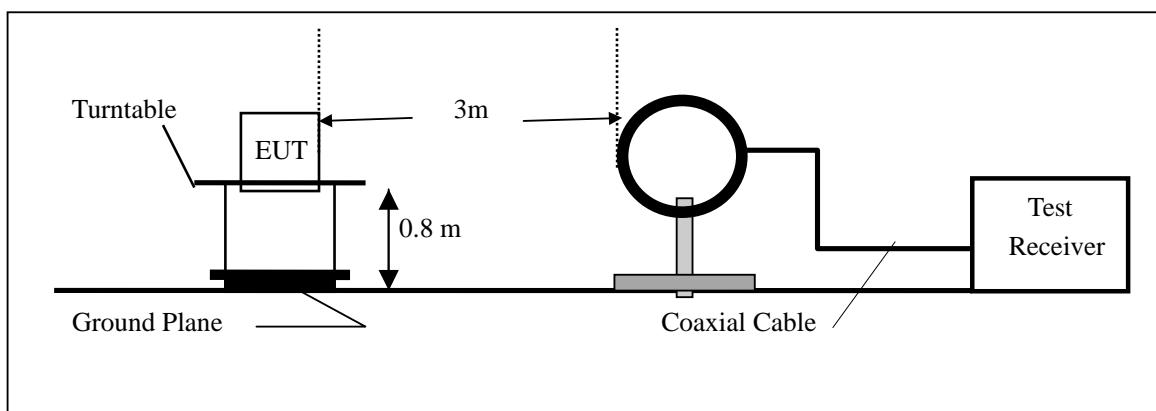
6. Radiated Emission Test

6.1 Measurement Procedure

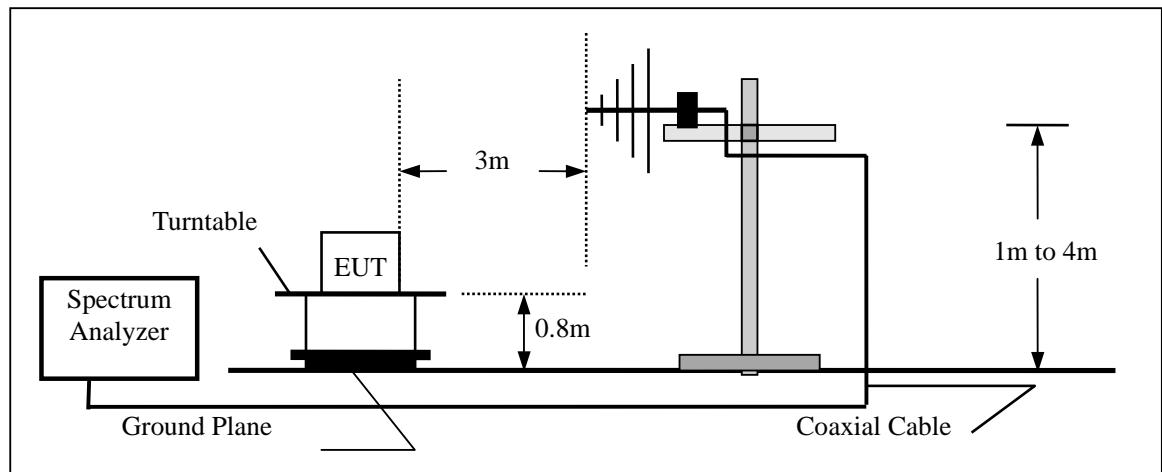
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on at least Ten highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequencies measured were completed.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used:

Open Area Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	ADVANTEST	R3132	120901472	06/07/2006	06/06/2007
EMI Test Receiver	R&S	ESCI 30	N/A	06/07/2006	06/06/2007
Pre-Amplifier	HP	8447D	2944A07999	06/07/2006	06/06/2007
Bi-log Antenna	EMCO	3142	9910-1436	06/07/2006	06/06/2007

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.5 Measurement Result

Operation Mode: Transmitting Mode at Bottom Frequency Test Date : July 22, 2006
 Fundamental Frequency: 915.3 MHz Test By: Jimmy
 Temperature : 25 Pol: Ver & Hor
 Humidity : 50 %
 Judgement : Passed by -4.38 dB at 1830.6 MHz Ant.Pol. Ver.

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
915.300	V	Peak	56.20	27.40	83.60	93.98	-10.38	F
1830.600	V	Peak	15.90	33.70	49.60	53.98	-4.38	H
2745.900	V	Peak	***			53.98		H
3661.200	V	Peak	***			53.98		H
4576.500	V	Peak	***			53.98		H
5491.800	V	Peak	***			53.98	At least 20 dB down	H
6407.100	V	Peak	***			53.98	than the limits	H
7322.400	V	Peak	***			53.98		H
8237.700	V	Peak	***			53.98		H
9153.000	V	Peak	***			53.98		H
Others	H/V	Peak	***			53.98		H

Remark :

- (1) Measuring frequencies from 25 MHz to the 10 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Datas 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) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz.

Operation Mode: Transmitting Mode At Top Channel
 Fundamental Frequency: 920.1 MHz
 Temperature : 25
 Humidity : 50 %
 Judgement : Passed by -4.48 dB at 1847.4 MHz Ant.Pol. Ver.

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
923.700	V	Peak	57.40	27.60	85.00	93.98	-8.98	F
1847.400	V	Peak	15.80	33.70	49.50	53.98	-4.48	H
2771.100	V	Peak	***			53.98		H
3694.800	V	Peak	***			53.98		H
4618.500	V	Peak	***			53.98		H
5542.200	V	Peak	***			53.98	At least 20 dB down	H
6465.900	V	Peak	***			53.98	than the limits	H
7389.600	V	Peak	***			53.98		H
8313.300	V	Peak	***			53.98		H
9237.000	V	Peak	***			53.98		H
others	H/V	Peak	***			53.98		H

Remark :

- (1) Measuring frequencies from 25 MHz to the 1GHz.
- (2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
- (3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Datas 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) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz.

7. Operation

7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = Fundamental Frequency , RBW,VBW= 1KHz, Span =200KHz.
4. Set SPA Max hold. Mark peak

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 6.2 Radiated Emission Measurement.

7.3 Measurement Equipment Used:

Same as 6.3 Radiated Emission Measurement.

7.4 Measurement Results:

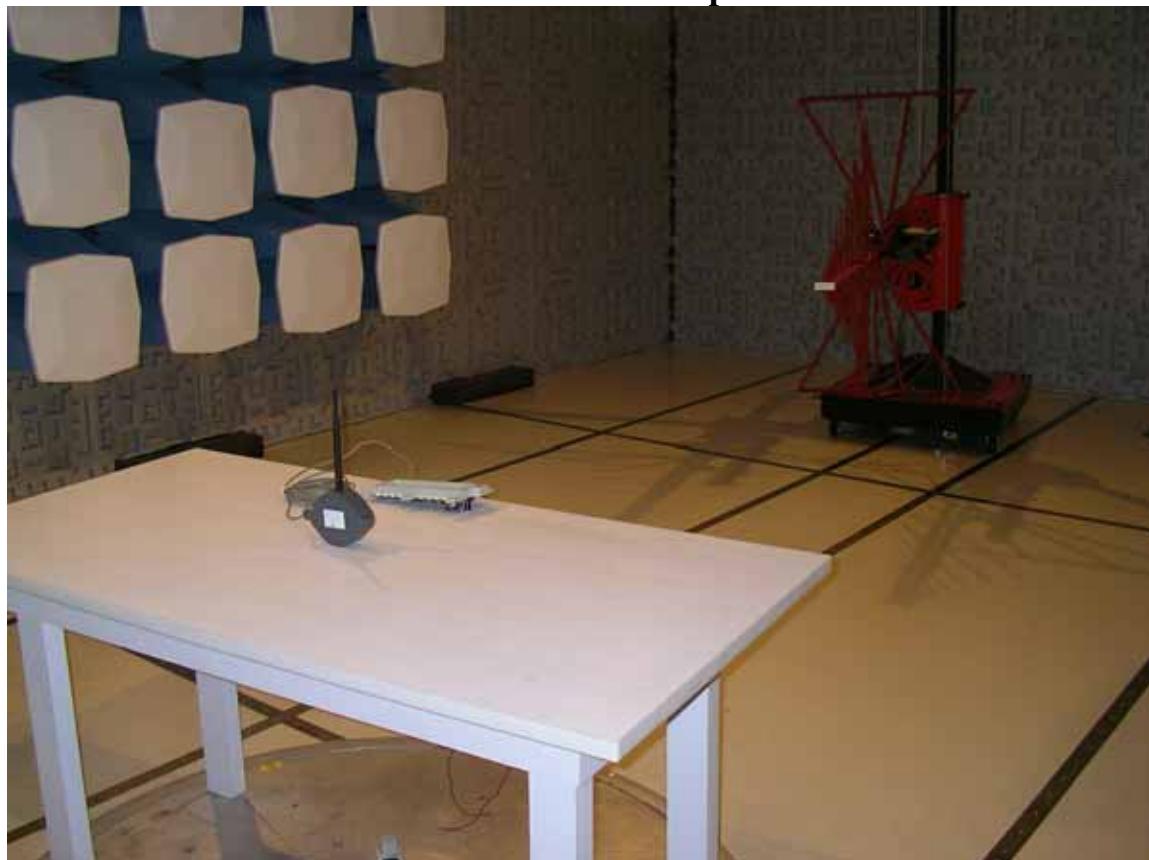
Measurement Result for the Bottom Channel(915.3 MHz > 902 MHz) Pass

Measurement Result for the Top Channel (923.7 MHz < 928 MHz) Pass

APPENDIX 1

PHOTOGRAPHS OF SET UP

Radiated Emission Setup Photos



APPENDIX 2

PHOTOGRAPHS OF EUT

Front View of Transmitter



Back View of Transmitter



Internal View of Transmitter -1



Internal View of Transmitter -2

