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ENGINEERING TEST REPORT # TR 315260 B
LSR Job #: C-2343

Compliance Testing of:
940-0132 Module

Test Date(s):
November 2015

Prepared For:
Rain Bird Corporation
6691 East Southpoint Rd
Tucson, AZ 85756

Test Report issued:
Adam Alger, Quality Systems Engineer – Test Services

Signature: Date: 3-14-16

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LS Research, LLC in Review

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

TESTING CERT #1255.01

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: 1255.01

Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948
FCC Registration Number: 90756

Industrie Canada Industry Canada

Canada

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-GEN – Issue 4
File Number: IC 3088-2
On file, 3 Meter Semi-Anechoic Chamber based on RSS-GEN – Issue 4
File Number: IC 3088-3

U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a U. S. Competent Body operating under the U. S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2).
Date of Validation: January 16, 2001

Validated by the European Commission as a U.S. Notified Body operating under the U.S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.
Date of Validation: November 20, 2002
Notified Body Identification Number: 1243

1.0 Client Information

Manufacturer Name:	Rain Bird Corporation
Address:	6991 E. Southpoint Road, Tucson, AZ 85756
Contact Person:	Anderson Micu

1.1 Equipment Under Test (EUT) Information

The following information has been supplied by the applicant.

Product Name:	940-0132 Module
Model Number:	940-0132
Serial Number:	None (Engineer Sample)
FCC ID:	2AGQP-F5500
IC:	20936-F5500

1.2 Product Information

IEEE 802.11 b/g/n (20 MHz channels only) with chip antennas (diversity)

1.3 Modifications Incorporated In the EUT for Compliance Purposes

None noted at time of test

1.4 Deviations & Exclusions from Test Specifications

None noted at time of test

1.5 Additional Information

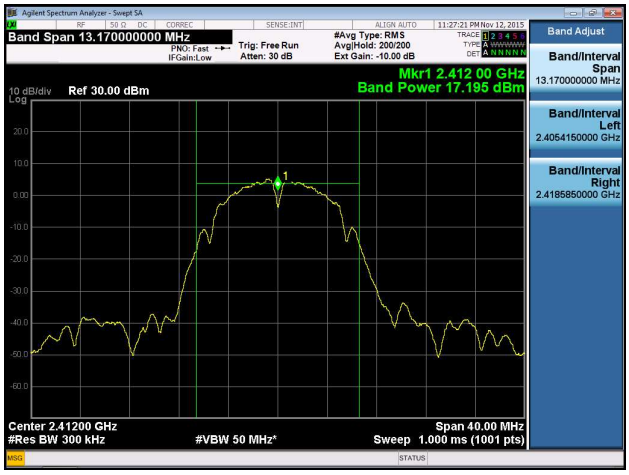
Programmed for continuous transmit and receive on channels 1-11 (2412-2462 MHz) using special test fixture with UART to USB connection to PC running TiWi-C-W Eval Tool V1.3.0.0.
EUT fitted with temporary connection for RF Conducted measurements

2.0 RF Conducted Measurement Data

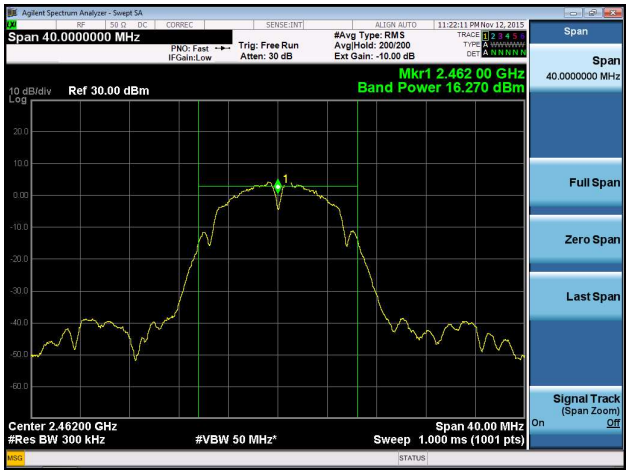
Table – Antenna 1

Mode (802.11)	Mode (Mbps)	Frequency (MHz)	6 dB DTS BW (MHz)	99 % BW (MHz)	20 dB OBW (MHz)	Meas Power (dBm)	Duty (dB)	Max Avg. Power (dBm)	Max Avg. Power Limit (dBm)	Max Avg. Power Margin (dB)	Meas PSD 100 kHz (dBm)	Duty (dB)	Max Avg. PSD 100 kHz (dBm)	Max Avg. PSD Limit (dBm / 3 kHz)	Max Avg. PSD Margin (dB)
b	1	2412	8.09	10.96	13.17	17.20	0.0	17.20	30	12.81	0.67	0.00	0.67	8	7.34
		2437	8.08	10.95	13.18	17.19	0.0	17.19		12.81	0.70	0.00	0.70		7.30
		2462	8.08	10.74	12.90	16.27	0.0	16.27		13.73	-0.40	0.00	-0.40		8.40
g	6	2412	16.38	17.24	20.61	13.32	0.1	13.42		16.58	-6.68	0.10	-6.58		14.58
		2437	16.38	17.20	20.58	13.35	0.1	13.45		16.55	-6.43	0.10	-6.33		14.33
		2462	16.38	17.21	20.55	12.65	0.1	12.75		17.25	-7.00	0.10	-6.90		14.90
n	6.5	2412	17.63	18.28	20.97	12.51	0.1	12.61		17.39	-7.56	0.10	-7.46		15.46
		2437	17.62	18.26	20.92	12.60	0.1	12.70		17.30	-8.18	0.10	-8.08		16.08
		2462	17.64	18.19	20.99	11.54	0.1	11.64		18.36	-9.12	0.10	-9.02		17.02

Plots – Maximum Peak Output Power



2412 MHz



2462 MHz

3.0 FCC SAR Test Exclusion Threshold

SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm

1-g SAR test exclusion threshold equation:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] * [√f(GHz)] ≤ 3.0

10-g SAR test exclusion threshold equation:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] * [√f(GHz)] ≤ 7.5

3.1 FCC SAR Test Exclusion Calculation

Frequency = 2412MHz
Output Power + tolerance = 17.2 dBm + 1.0 dB = 18.2
EIRP = 18.2 dBm = 66.1 mW

Minimum separation distance for SAR test exclusion (1g tissue) = (Pout * [√f(GHz)])/3
= (66.1*1.55)/3
= **34.2 mm**

3.2 FCC Conformance Summary

The EUT was found to MEET the 35 mm minimum test separation distance threshold for SAR test exclusion per FCC §2.1091(mobile) and §2.1093(portable) using methods of FCC KDB 447498 D01 General RF Exposure Guidance v06 as a standalone device.

4.0 Industry Canada Low Power Exemption

RSS 102 Issue 5 Section 2.5 states that all transmitters that meet the exemption limits as stated in section 2.5.1 are exempt from routine SAR and RF exposure evaluation.

Output Power Evaluation.

Evaluation Frequency = 2412 MHz

Maximum Effective Isotropic Radiated Power (dBm) = 17.2 dBm + 0.5 dBi + 1.0 dB = 18.7
Maximum Effective Isotropic Radiated Power (mW) = $\log^{-1}$(EIRP (dBm)/10) = **74.13 mW**

Minimum separation distance for SAR test Exclusion (1g tissue) = **30 mm** (based on table 1 of RSS 102)

4.1 IC Conformance Summary

The EUT was found to MEET the 30 mm minimum test separation distance threshold for SAR test exclusion per IC RSS-102 Issue 5.

END OF REPORT

Date	Version	Comments	Person
3-14-16	V1	Final	Adam A