DNB ENGINEERING, INC.

CERTIFICATION
FOR
INTENTIONAL RADIATOR

per
Part 15 Subpart C
(CFR 47, 15.201, - 15.209 &15.231)

Irrigation Control Transmitter
Model No. WRH900
916.5 MHz

PREPARED FOR APPLICANT:
RainBird Corporation
7590 Britannia Court
San Diego, CA 92154
FRN: 0008350290

PREPARED BY:
DNB ENGINEERING, INC.
5969 Robinson Avenue
Riverside, CA 92503-8620
(909) 637-2630

TRANSMITTAL SUMMARY

Unit tested: Irrigation Control Remote Transmitter
Model #: WRH900
FCC ID: QVPWRH900

Specifications: ANSI C63.4 1992 and CFR 47 FCC part 15 Subpart C

Purpose of Report: This report was prepared to document the status of the Irrigation Control RemoteTransmitter (916 MHz) with requirements of the standards listed above.

Requirements not applicable to EUT
Part 15.37 - Not applicable
Emergency Broadcast System - Not applicable
Spread Spectrum Exhibit - Not applicable
Scanning Receiver - Not applicable

Test Summary The EUT's compliance status according to the tests performed is as follows.

REQUIREMENTS	STATUS
FCC part 15 Subpart C	
per 15.201-, 15.209 & 15.231	COMPLIANT

The report shall not be reproduced, except in full, without the written approval of DNB ENGINEERING, INC. Results contained in this report relate only to the item tested.

The Irrigation Control Remote Transmitter M/N WRH900 met all the criteria pertaining to standards called out for testing.

TABLE OF CONTENTS

1.0 ADMINISTRATIVE DATA

Certifications and Qualifications

I certify that DNB Engineering, Inc conducted the tests performed in order to obtain the technical data presented in this application. Also, based on the results of the enclosed data, I have concluded that the equipment tested meets or exceeds the requirements of the Rules and Regulations governing this application.

Measurement Repeatability Information

The test data presented in this report has been acquired using the guidelines set forth in FCC Part 15 Subpart C (CFR 47, 15.201 – 15.209 and 15.231). The test results presented in this document are valid only for the equipment identified herein under the test conditions described. Repeatability of these test results will only be achieved with identical measurement conditions. These conditions include: The same test distance, EUT Height, Measurement Site Characteristics, and the same EUT System Components. The system must have the same Interconnecting Cables arranged in identical placement to that in the test set-up, with the system and/or EUT functioning in the identical mode of operation (i.e. software and so on) as on the date of the test. Any deviation from the test conditions and the environment on the date of the test may result in measurement repeatability difficulties.

All changes made to the EUT during the course of testing as identified in this test report must be incorporated into the EUT or identical models to ensure compliance with the FCC regulations.

C. L. Payne III (Para. 1.1)

Manager, Test Dept.

DNB Engineering, Inc. (Riverside Facility)

Tel. (909) 637-2630 FAX (909) 637-2704

E-mail: Les@dnbenginc.com

1.1.1 Request for Certification Per 2.1033(b)1:

Applicant: Rain Bird Corporation
7590 Britannia Court
San Diego, CA 92154
FRN: 0008350290

Contact: Hiram Sanchez
Phone: (619) 661-4416

Equipment Under Test: Irrigation Control Remote Transmitter

FCC ID: QVPWRH900

1.2 Related Submittals/Grants

None.

1.3 Purpose of Tests

The purpose of this series of tests was to demonstrate the Electromagnetic Compatibility (EMC) characteristics of the EUT. The following tests were performed:

REQUIREMENTS	STATUS
FCC part 15 Subpart C	
Per 15.201- 15.209 &15.231	COMPLIANT

2. TEST DESCRIPTION

2.1 Test Configuration

Configuration	Unit Name - Processor, Monitor Printer, Cable, etc. (indent for features of a unit)	Style/Model/ Part No.	Comments/ FCC ID#
	Irrigation Control Remote (916 MHz)		

2.2 Equipment Description

Please see Appendix A

2.3 Mode of Operation

EUT was placed in three orthogonal positions to determine worst case emissions. Fresh batteries were used for final measurements.

2.4 Antenna Requirement - per 15.203

The antenna is internally fixed.

2.5 Circuit Description - per 2.1033(b)4

Please see Owners Manual – Appendix A

2.6 Schematics

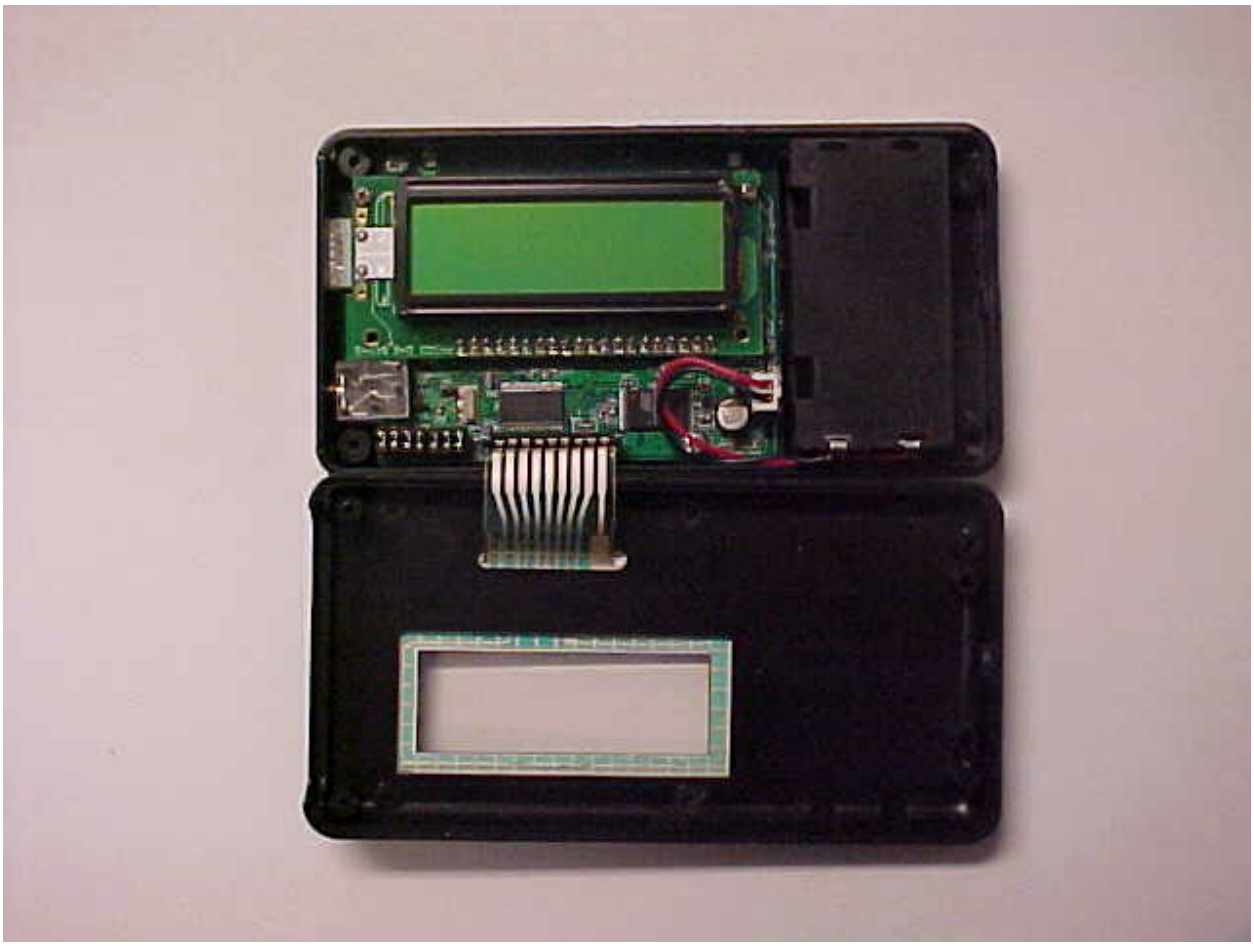
Please see Section 5

2.7 Photographs of EUT - per 2.1033(b)(7)

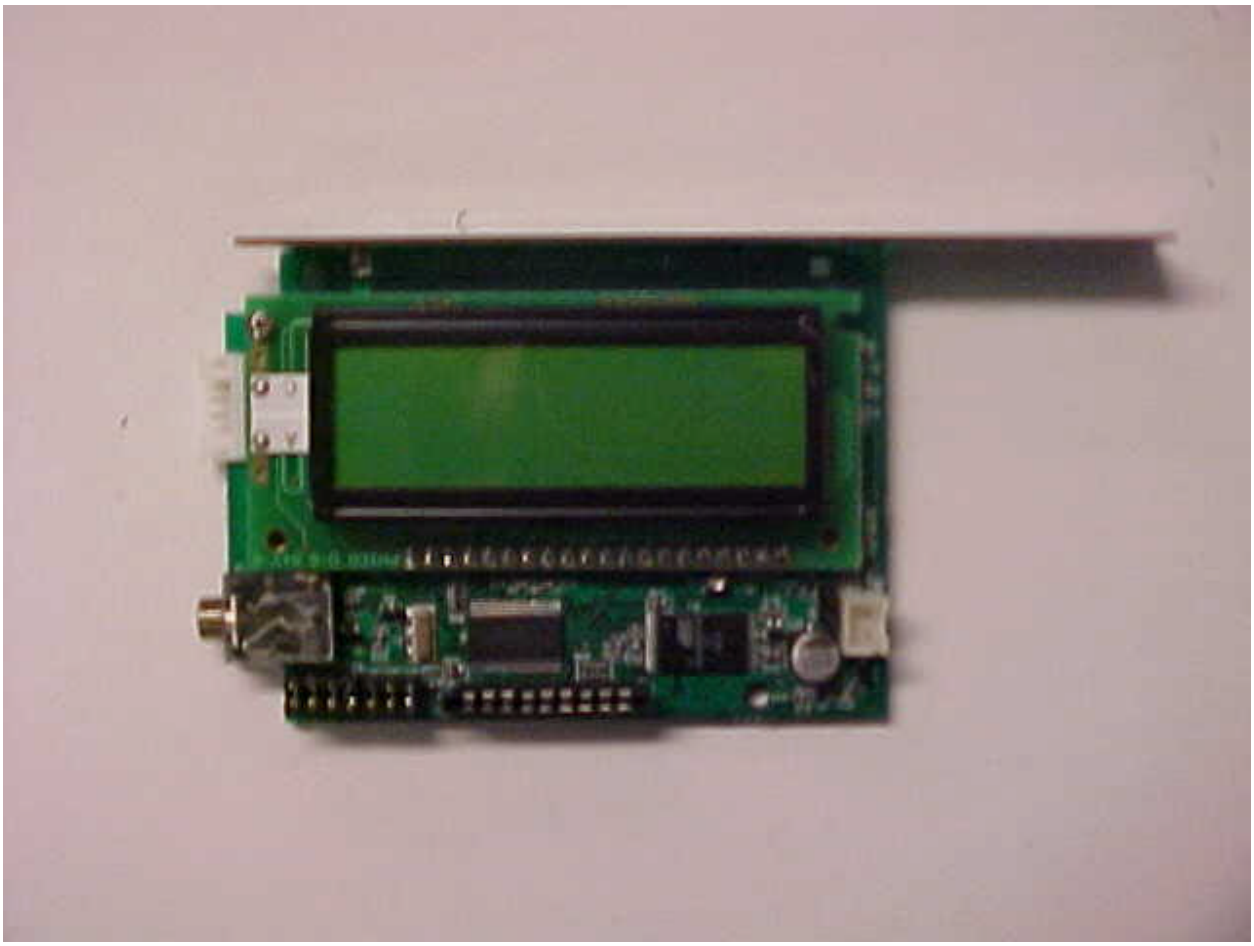
Photographs of EUT - per 2.1033(b)(7) continued

Photographs of EUT - per 2.1033(b)(7) continued

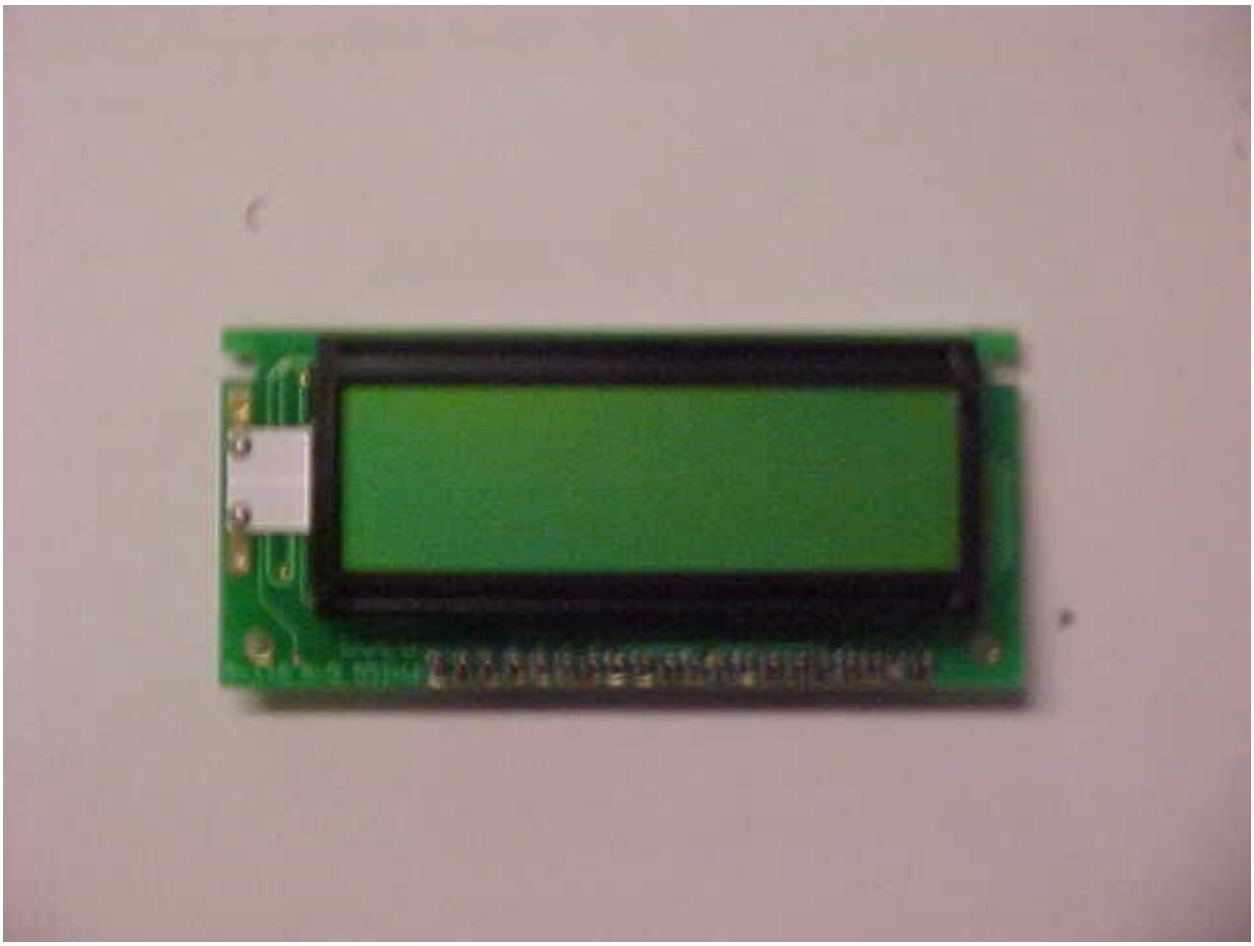
Photographs of EUT - per 2.1033(b)(7) continued



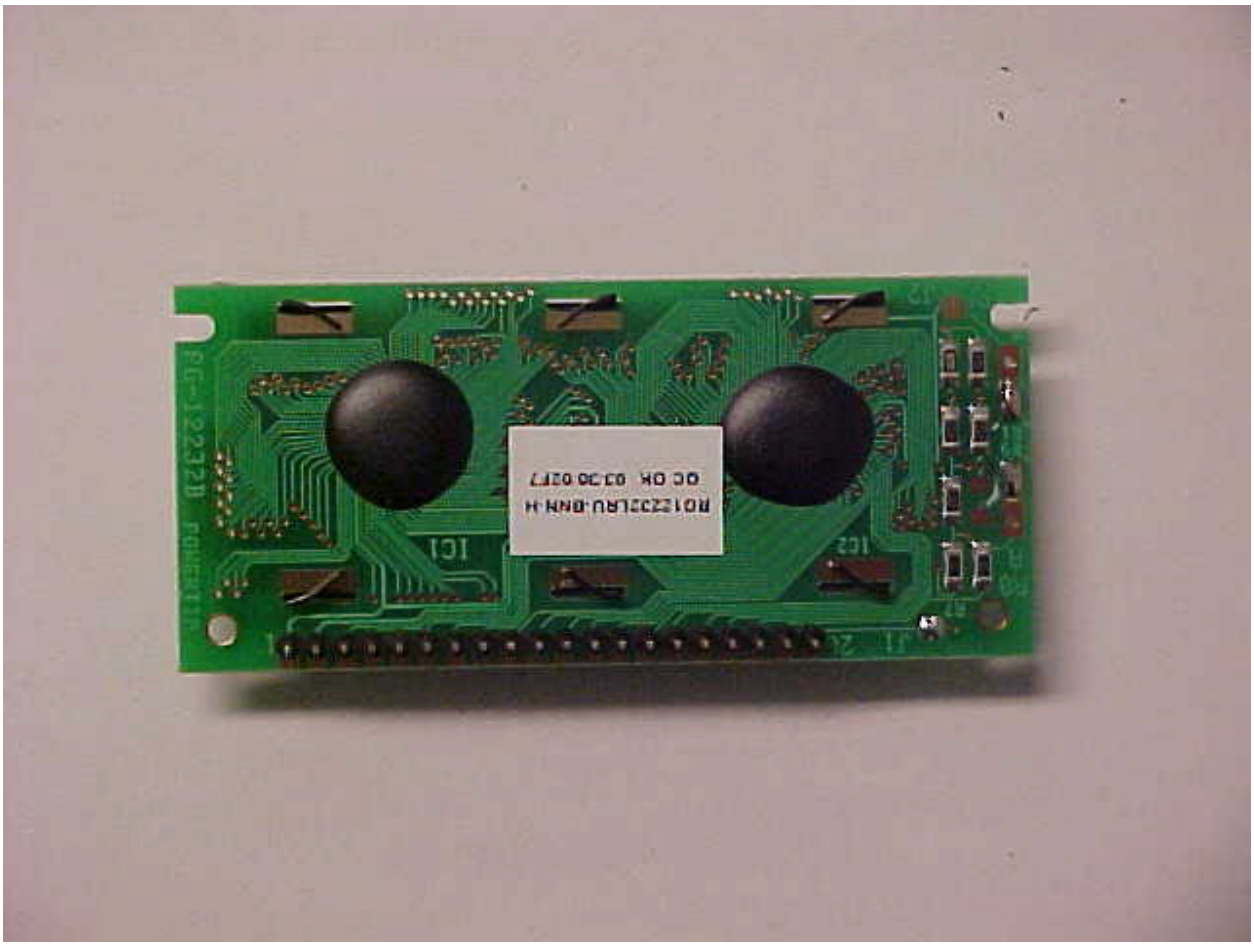
Photographs of EUT - per 2.1033(b)(7) continued



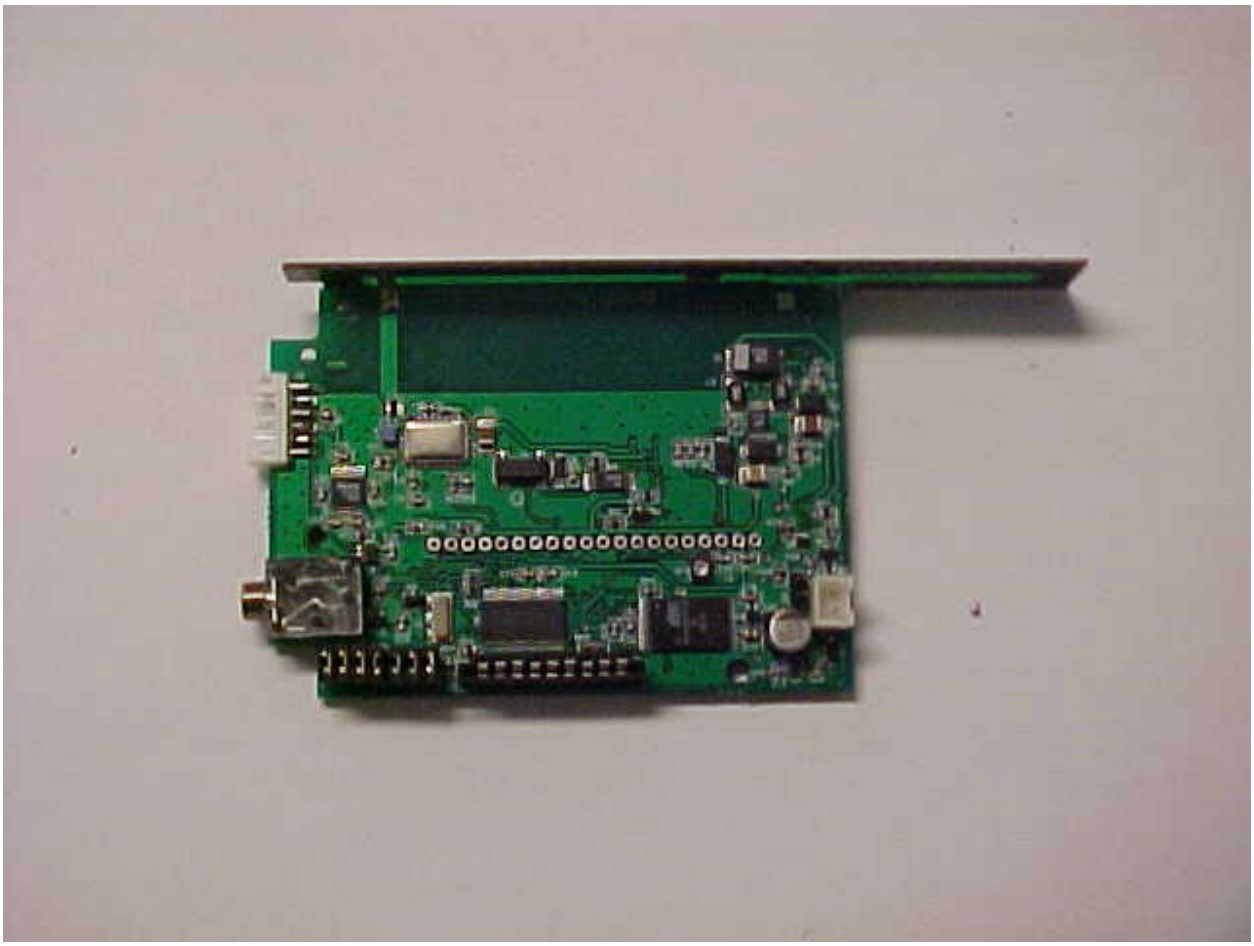
Photographs of EUT - per 2.1033(b)(7) continued



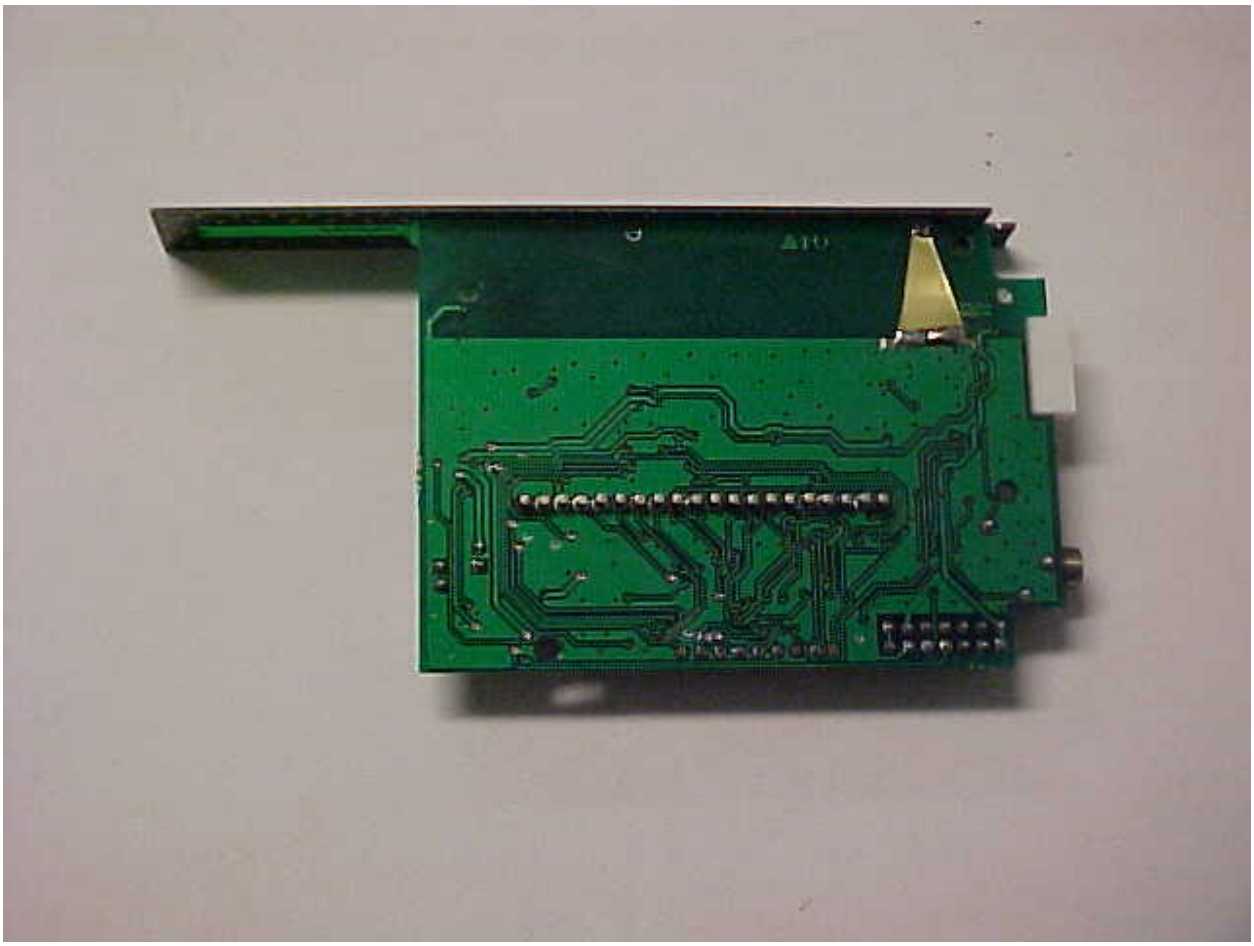
Photographs of EUT - per 2.1033(b)(7) continued



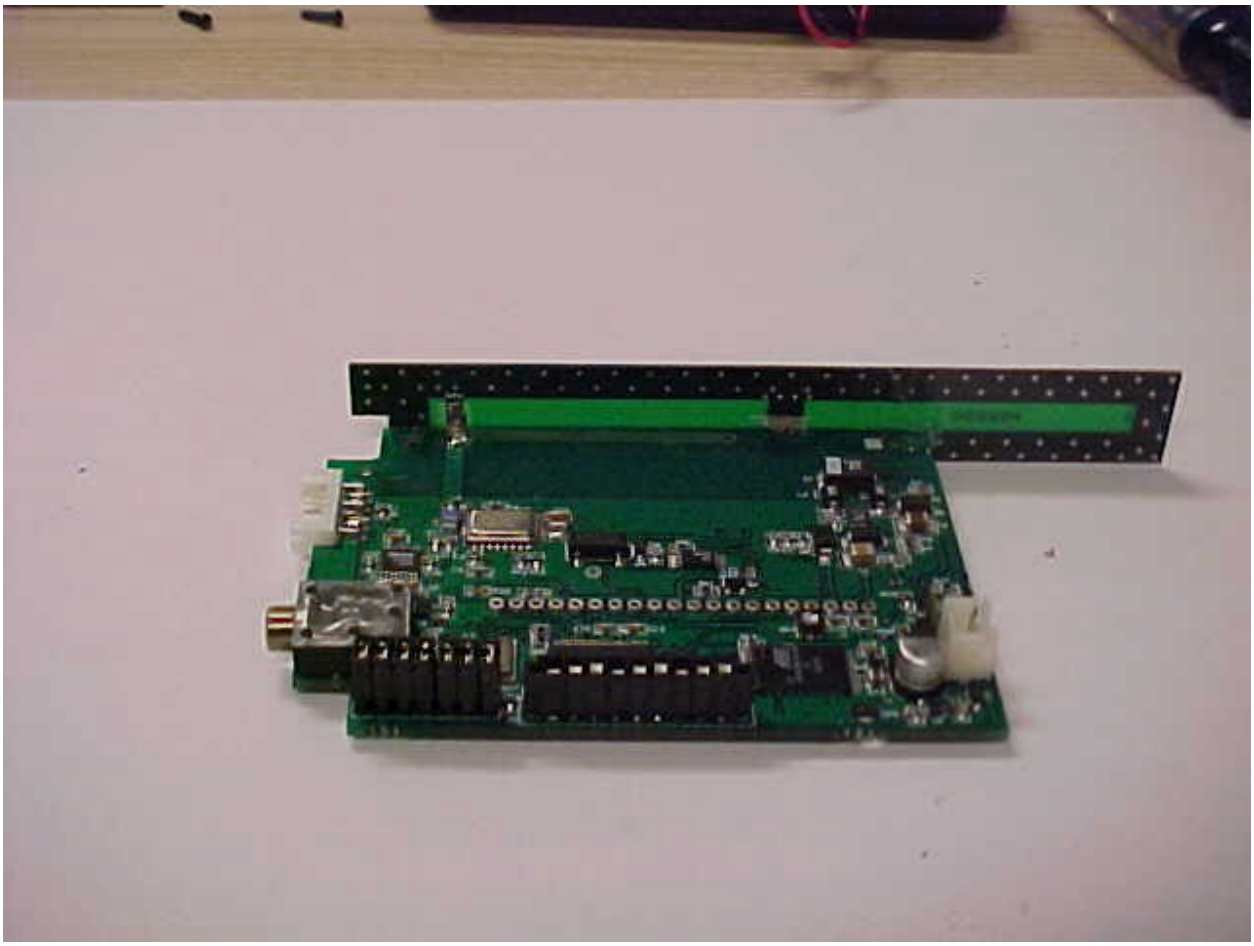
Photographs of EUT - per 2.1033(b)(7) continued



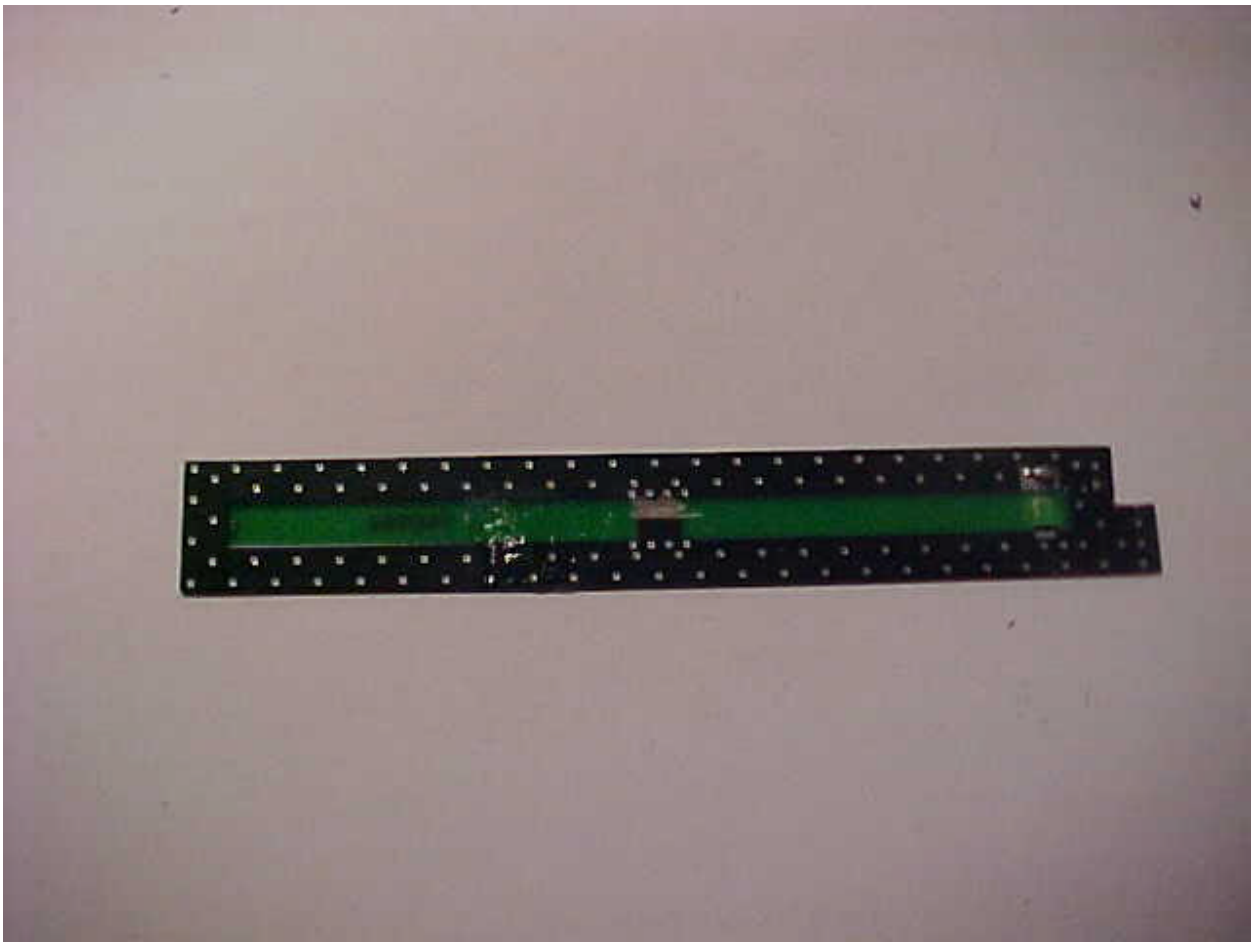
Photographs of EUT - per 2.1033(b)(7) continued



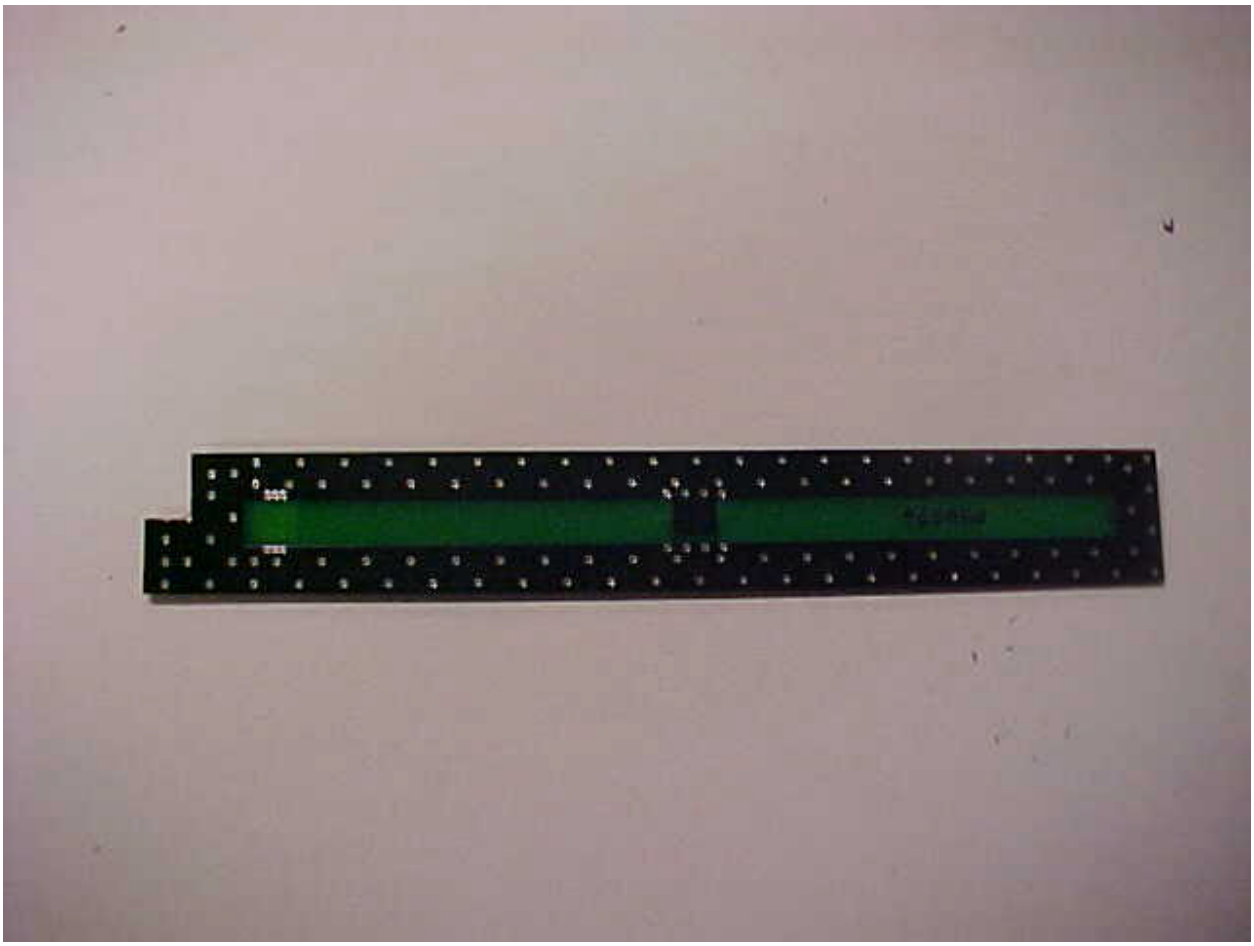
Photographs of EUT - per 2.1033(b)(7) continued



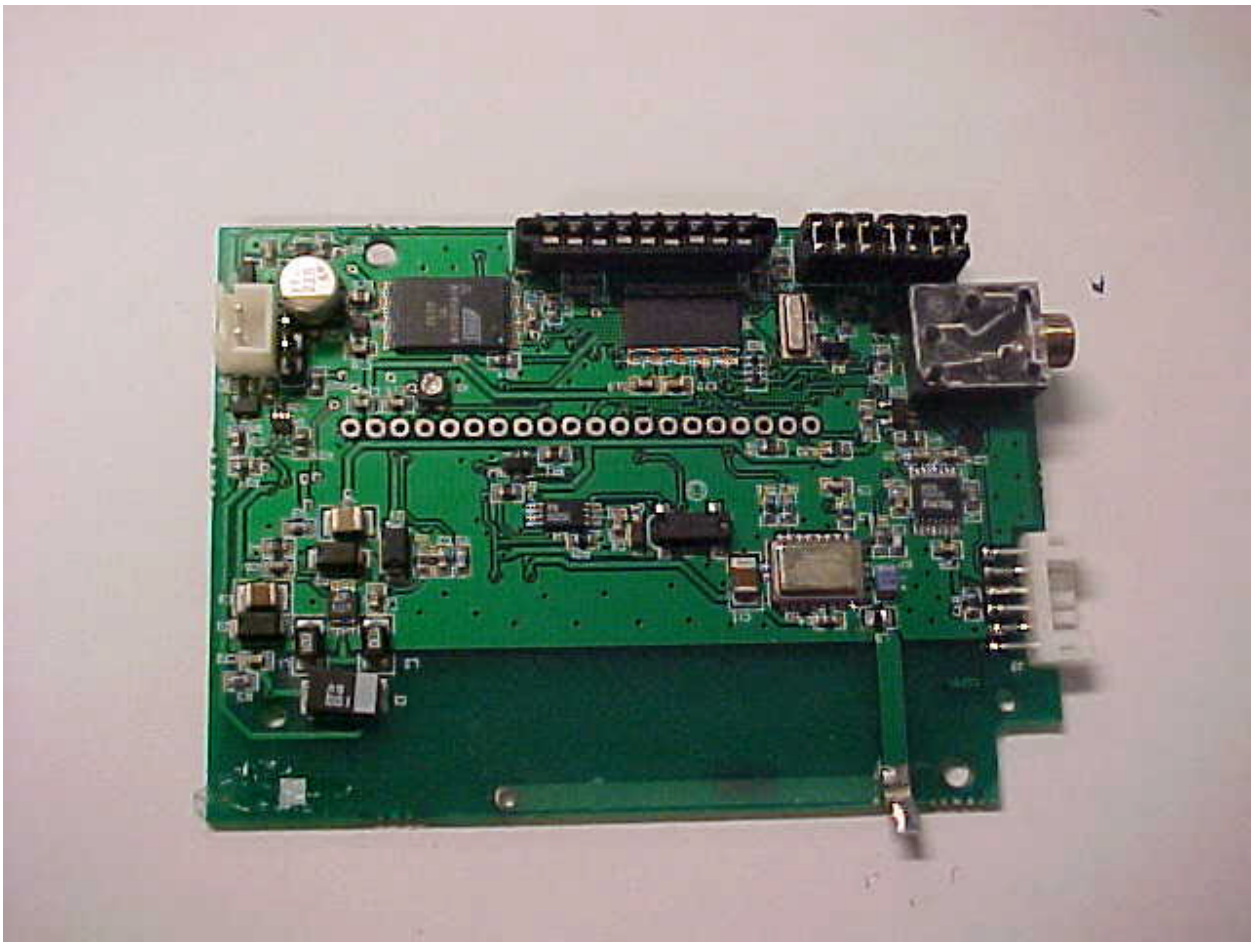
Photographs of EUT - per 2.1033(b)(7) continued



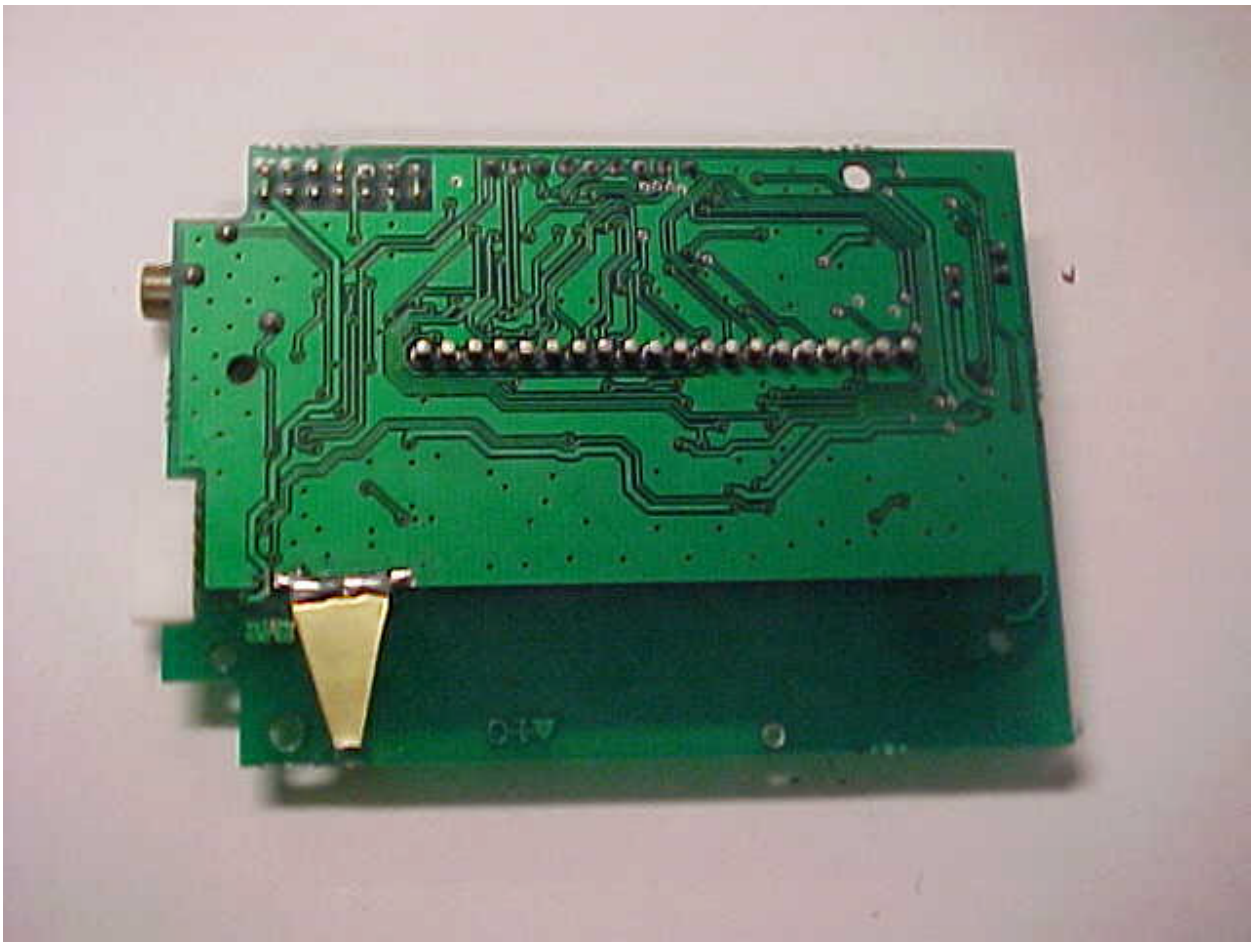
Photographs of EUT - per 2.1033(b)(7) continued



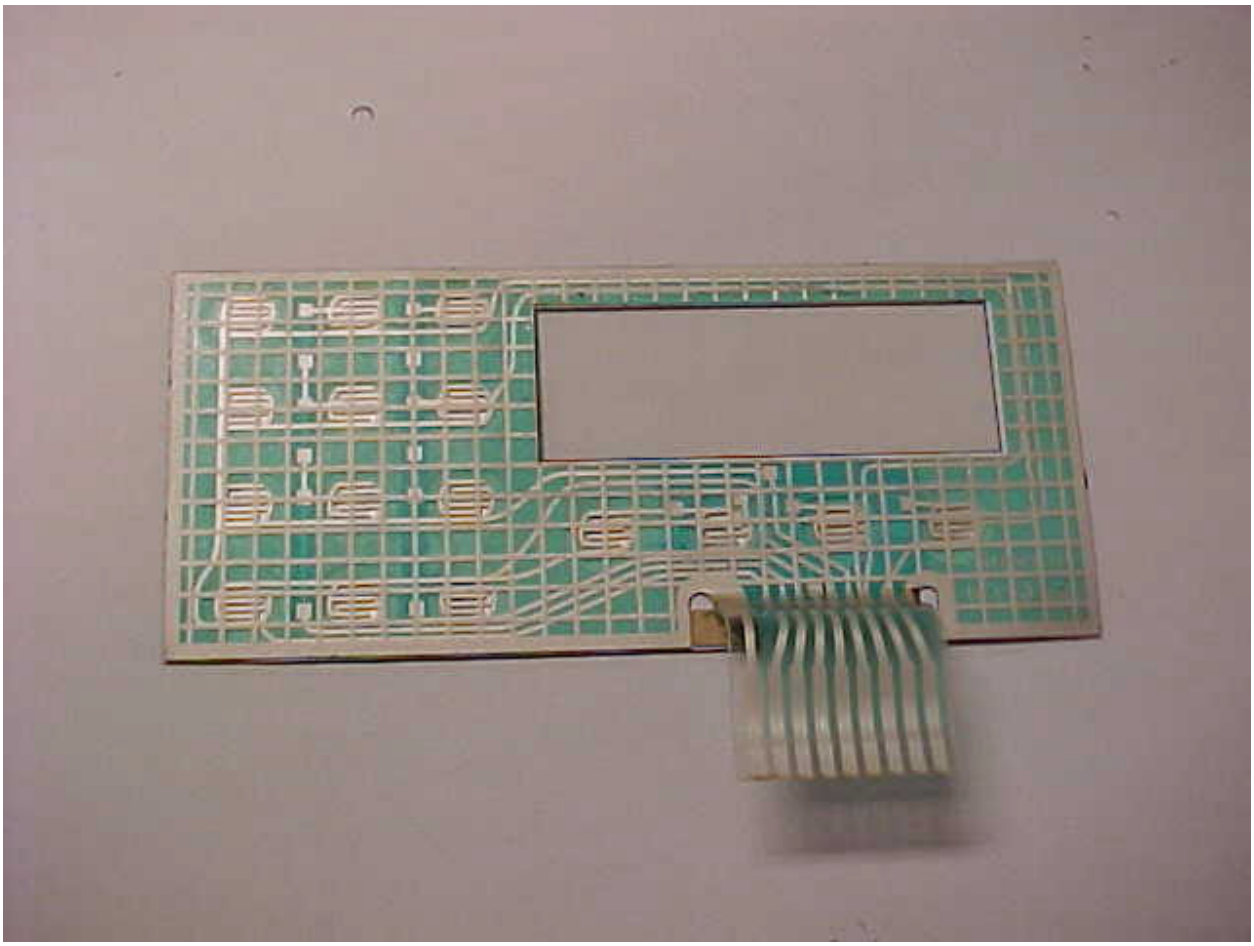
Photographs of EUT - per 2.1033(b)(7) continued



Photographs of EUT - per 2.1033(b)(7) continued



Photographs of EUT - per 2.1033(b)(7) continued



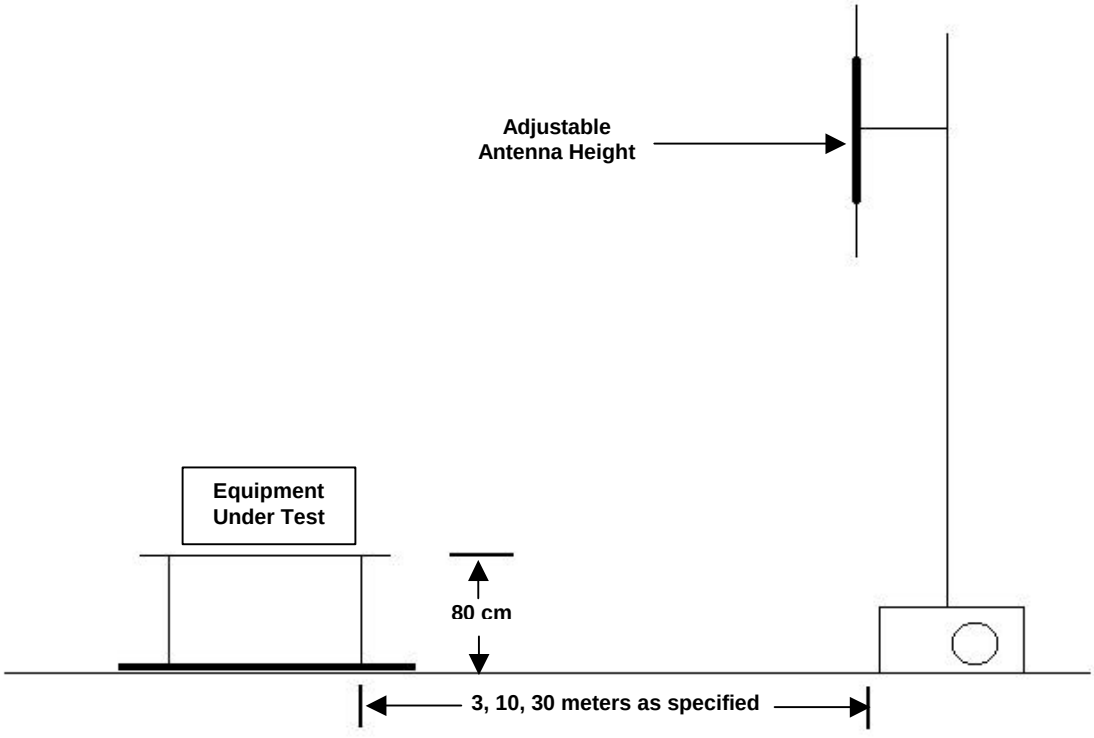
3. EMISSIONS

Per FCC Part 15 Subpart C

3.1 Radiated Emissions Test Setup and Procedure - Per 2.1033(b)(6) Per 2.947(a)

The EUT was placed on a wooden table 1 meter wide and 1.5 meters long, which rests on a inground turntable 3 meter open area test site test site. The top of the table is 80 cm above the ground plane. The turntable can be rotated 360 degrees. Measuring antenna is set at the prescribed distance. (Measurements are made with broad band antennas that have been correlated with tuned dipole antennas). The mast is 6 meters high and is self-supporting. The height of the antenna can be varied from 1 to 4 meters. Positioning of the antenna is controlled remotely.

3.1.1 Spurious Radiation Test Site Per 2.1033(b)6



Radiated Test Setup and Procedure - cont'd

The EUT is put into the operational test mode as stated in Section 2.2.1 is then started.

The spectrum analyzer is setup to store the peak emission over the band of the antenna. Peak EUT and ambient emissions are stored while the turntable is rotated 360^0. Peak spectrum analyzer trace is then recorded with the addition of antenna and cable correction factors. The limit is recorded on the same graph. A receiver with CISPR Quasi Peak capabilities is then used on the frequencies identified as the highest with respect to the plotted limit. Ambience is noted on the graph along with EUT emissions. The highest EUT frequencies, with respect to the limit, are maximized.

To maximize emissions levels, the turntable is rotated and the antenna is raised and lowered to determine the point of maximum emanations. The cables are then manipulated at that point to maximize emissions. Measurements are made with the antennas in each horizontal and vertical polarization separately. The data obtained from these tests is corrected with the proper cable, preamplifier and antenna factors. The results are then transcribed onto tables that show the maximum emission levels. The highest emissions are listed in a Radiated Emissions Summary table.

If no emissions can be found, the lowest harmonics of the EUT clocks within the bands of the standard are tuned into with the receiver. If no emissions are found, the noise floor will be entered into the table and noted. A minimum of six frequencies will be logged. Summary results
will reflect only actual emissions from the EUT.

The field intensity measurements are made using standard techniques with a spectrum analyzer or EMI receiver as the calibrated Field Intensity Meter (FIM). Preamplifiers and filters are used when required.

When using the Hewlett Packard Model 8566B Spectrum Analyzer as the FIM, the Analyzer is calibrated to read signal level in dBm. Where:

0 dBm (50 ohms) = 107 dBuV (50 ohms)

The signal level (dBuV) = indicated signal level (dBm) + 107 dB. To obtain the signal level in dBuV/m it is necessary to add the antenna factor in dB.

3.1.2 Example Of Typical Calculation Per 2.1033(b)6

Measurement Distance = 3 Meter		
Reading @ 60 MHz	→	49.0 dBuV
Antenna Factor	+7.5 dBuV	
Cable Loss	+2.0 dBuV	
Preamplifier	-25.5 dBuV	
	-16.0 dBuV →	-16.0 dBuV
Field Strength dBuV/m at 3 Meter	→	33.0 dBuV

The Following FCC limits for acceptance were used:

Limit 916 MHz (Field Strength of Fundamental):
12,500 ?V/M = 20 log (12,500) dB?V/M = 81.9 dB?V/M @ 3 Meters

Limit 916 MHz (Field Strength of Spurious Emissions):
1,250 ?V/M = 20 log (500) dB?V/M = 61.9 dB?V/M @ 3 Meters

Limit 30 to 230 MHz: (per IEC 55022 @ 10 meters)
32 ?V/M = 20 log (32) dB?V/M = 30.0 dB?V/M @ 10 Meters

Limit 230 to 1000 MHz: (Not at the Carrier Frequency)
71 ?V/M = 20 log (71) dB?V/M = 37.0 dB?V/M @ 10 Meters

Limit >1000 MHz:
158?V/M = 20 log (158) dB?V/M = 44.0 dB?V/M @ 10 Meters

3.1.3 Field Strength of Fundamental

Test results are provided on pages 25 & 26.

3.1.4 Harmonic Radiated Emissions

Test results are provided on pages 25 & 26.

3.1.5 Spurious Emissions Not Associated With Fundamental

Per FCC Part 15 Subpart C, 15.209 @ 3meters, No emissions were deleted.

DNB
3535 W. Commonwealth Ave.
Fullerton, CA 92833
(714) 870-7781
FAX (714) 870-5081

CFR 47 Subpart C Worksheet

DNB Job Number:	38111B	Date: 11 Feb 2003	Specification
Customer:	Rain Bird Inc		FCC Part 15 Subpart C paragraph 15.209 paragraph 15.231
Model Number:	WRH900	Serial Number: N/A	
Description:	Transmitter, 916.5MHz		

EUT performed within the requirements of the applicable Standard(s) [X] YES [ ] NO Signed

B = A.H. Systems SAS-200/540 Biconical Antenna S/N 138 (30-200 Mhz)
L = EMCO 3146 Log-Periodic Antenna S/N 1284 (200-1000 Mhz)
H = Electro-Metrics M/N 3115 Double Ridge Guide Antenna S/N 2280 (1-18 Ghz)
ACF = Antenna correction factor
AMP = Preamplifer Gain
CBL = Cable Los
DCF = Duty Cycle Correction Factor
Corr = Corrected reading = Meter + ACF + AMP + CBL + DCF
MD = Type of reading PK = Peak reading QP = Quasi-peak reading AV= Average reading
PL = Antenna polarity and type V = Vertical H = Horizontal
"*" = Readings taken with a resolution bandwidth of 10KHz do to nearby ambient signal

NOTES: Limits are from FCC Part 15 Subpart C para 15.231.

Freq GHz	Meter	ACF	AMP	CBL	DCF	Corr dBuV	Limit dBuV	Delta dBuv	Corr uV	Limit uV	Delta uV	MD	PL
916.5	67.5	27.8	-20.6	5.2	-2.6	77.3	81.94	-4.64	7328	12500	-5172	PK	H
1833	44.1	27.9	-20.0	7.5	-2.6	56.9	61.94	-5.04	700	1250	-550	PK	H
2749.5	21.8	30.0	-30.7	8.3	-2.6	26.8	61.94	-35.14	22	1250	-1228	PK	H
3666	20.0	32.1	-30.9	9.6	-2.6	28.2	61.94	-33.74	26	1250	-1224	PK	H
4582.5	20.0	33.5	-26.4	12.0	-2.6	36.5	61.94	-25.44	67	1250	-1183	PK	H
5499	20.0	34.7	-26.4	13.8	-2.6	39.5	61.94	-22.44	94	1250	-1156	PK	H
6415.5	20.0	35.9	-24.8	15.0	-2.6	43.5	61.94	-18.44	150	1250	-1100	PK	H
7332	20.0	37.3	-24.9	15.8	-2.6	45.6	61.94	-16.34	191	1250	-1059	PK	H
8248.5	20.0	38.1	-26.2	17.5	-2.6	46.8	61.94	-15.14	219	1250	-1031	PK	H
9165	20.0	38.2	-17.0	20.5	-2.6	59.1	61.94	-2.84	902	1250	-348	PK	H
916.5	70.1	27.8	-20.6	5.2	-2.6	79.9	81.94	-2.04	9886	12500	-2614	PK	V
1833	46.9	27.9	-20.0	7.5	-2.6	59.7	61.94	-2.24	966	1250	-284	PK	V
2749.5	20.0	30.0	-30.7	8.3	-2.6	25	61.94	-36.94	18	1250	-1232	PK	V
3666	20.0	32.1	-30.9	9.6	-2.6	28.2	61.94	-33.74	26	1250	-1224	PK	V
4582.5	20.0	33.5	-26.4	12.0	-2.6	36.5	61.94	-25.44	67	1250	-1183	PK	V
5499	20.0	34.7	-26.4	13.8	-2.6	39.5	61.94	-22.44	94	1250	-1156	PK	V
6415.5	20.0	35.9	-24.8	15.0	-2.6	43.5	61.94	-18.44	150	1250	-1100	PK	V
7332	20.0	37.3	-24.9	15.8	-2.6	45.6	61.94	-16.34	191	1250	-1059	PK	V
8248.5	20.0	38.1	-26.2	17.5	-2.6	46.8	61.94	-15.14	219	1250	-1031	PK	V
9165	20.0	38.2	-17.0	20.5	-2.6	59.1	61.94	-2.84	902	1250	-348	PK	V

5969 Robinson Avenue
Riverside, CA 92503
(909) 637-2630
FAX (909) 637-2704

EMI Datasheet (ITE Devices)

DNB Job Number:	38011B	Date: 12 Feb 2003	Specification
Customer:	Rain Bird Inc		[X] FCC Part 15 Class B
Model Number:	WRH900	Serial Number: N/A	
Description:	Transmitter, 916.5 MHz		

EUT performed within the requirements of the applicable Standard(s) [X] YES [ ] NO Signed

Bcn = A.H. Systems SAS-200/540 Biconical Antenna S/N 138 (30-200 Mhz)
Log = EMCO 3146 Log-Periodic Antenna S/N 1284 (200-1000 Mhz)
Dcf = Distance Correction Factor = $20*LOG_{10}$(Test Distance/Specification Distance)
Typ = Type of reading PK = Peak reading QP = Quasi-peak reading

Cbl = Cable Loss
Amp = Preamplifier Gain
Pl = Antenna polarity V = Vertical H = Horizontal
"*" = Readings taken with a res bandwidth of 10KHz do to nearby ambient signal

NOTES: Unintentional Radiator and Receiver Emissions

Freq	Meter	Bcn	Log	Cbl	Amp	Dcf	Corr	Lim dB	Delta	Corr uV	Lim uV	Delta	Typ	Pl
30.548	27.8	12.5	0	0.8	-24.8	0	16.3	30	-13.7	7	32	-25	PK	H
47.676	30.8	10.1	0	0.8	-24.7	0	17	30	-13	7	32	-25	PK	H
109.130	32.4	10.0	0	1.4	-24.6	0	19.2	30	-10.8	9	32	-23	PK	H
129.631	29.6	11.4	0	1.5	-24.6	0	17.9	30	-12.1	8	32	-24	PK	H
222.118	26.6	14.7	0	2.0	-24.7	0	18.6	30	-11.4	9	32	-23	PK	H
344.745	27.9	0	14.9	2.6	-24.8	0	20.6	37	-16.4	11	71	-60	PK	H
989.769	28.4	0	24.4	4.8	-25.3	0	32.3	37	-4.7	41	71	-30	PK	H
30.498	28.3	12.5	0	0.8	-24.8	0	16.8	30	-13.2	7	32	-25	PK	V
47.508	34.3	10.1	0	0.8	-24.7	0	20.5	30	-9.5	11	32	-21	PK	V
109.543	28.7	10.1	0	1.4	-24.6	0	15.6	30	-14.4	6	32	-26	PK	V
129.158	26.9	11.4	0	1.5	-24.6	0	15.2	30	-14.8	6	32	-26	PK	V
222.566	32.2	14.7	0	2.0	-24.7	0	24.2	30	-5.8	16	32	-16	PK	V
344.393	26.8	0	14.9	2.6	-24.8	0	19.5	37	-17.5	9	71	-62	PK	V
988.985	22.5	0	24.4	4.8	-25.3	0	26.4	37	-10.6	21	71	-50	PK	V

3.1.6 Duty Cycle Correction

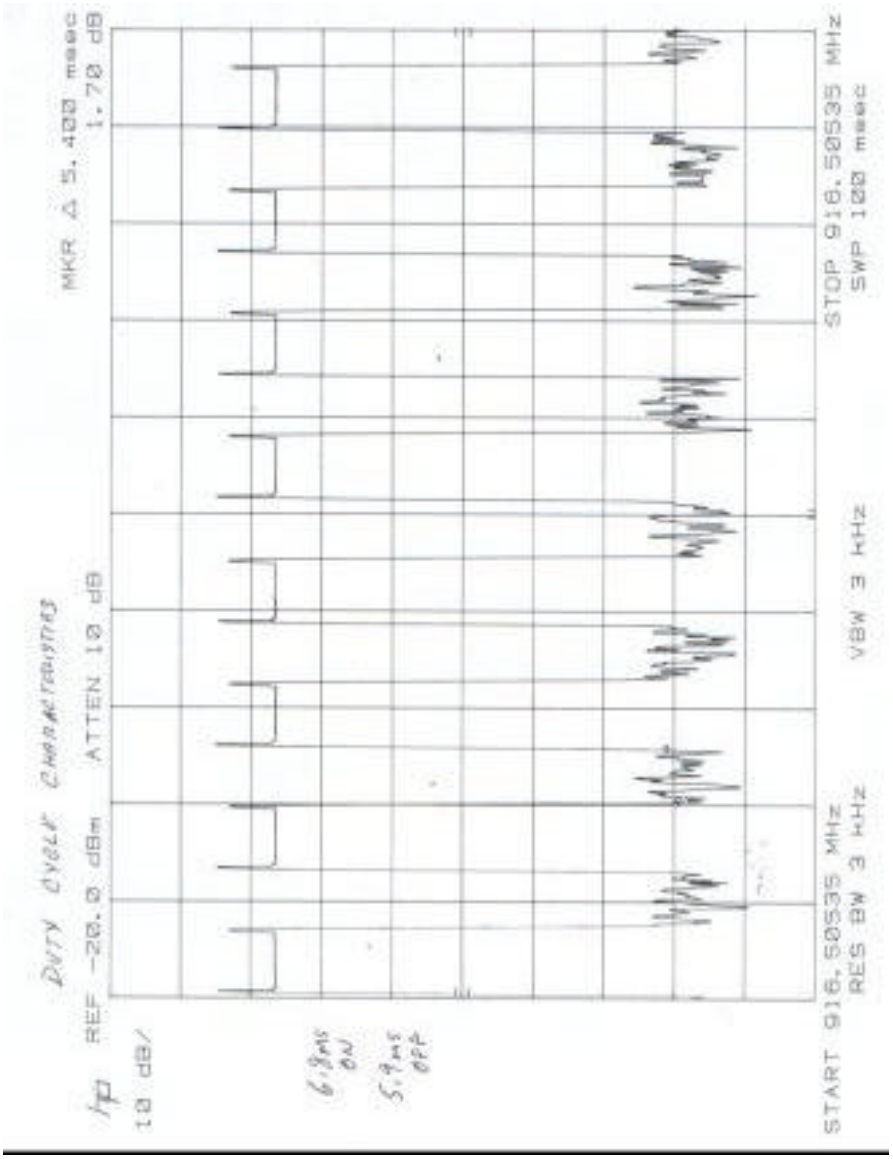
Duty cycle correction is determined by counting the number of pulses on over a 100 ms period.

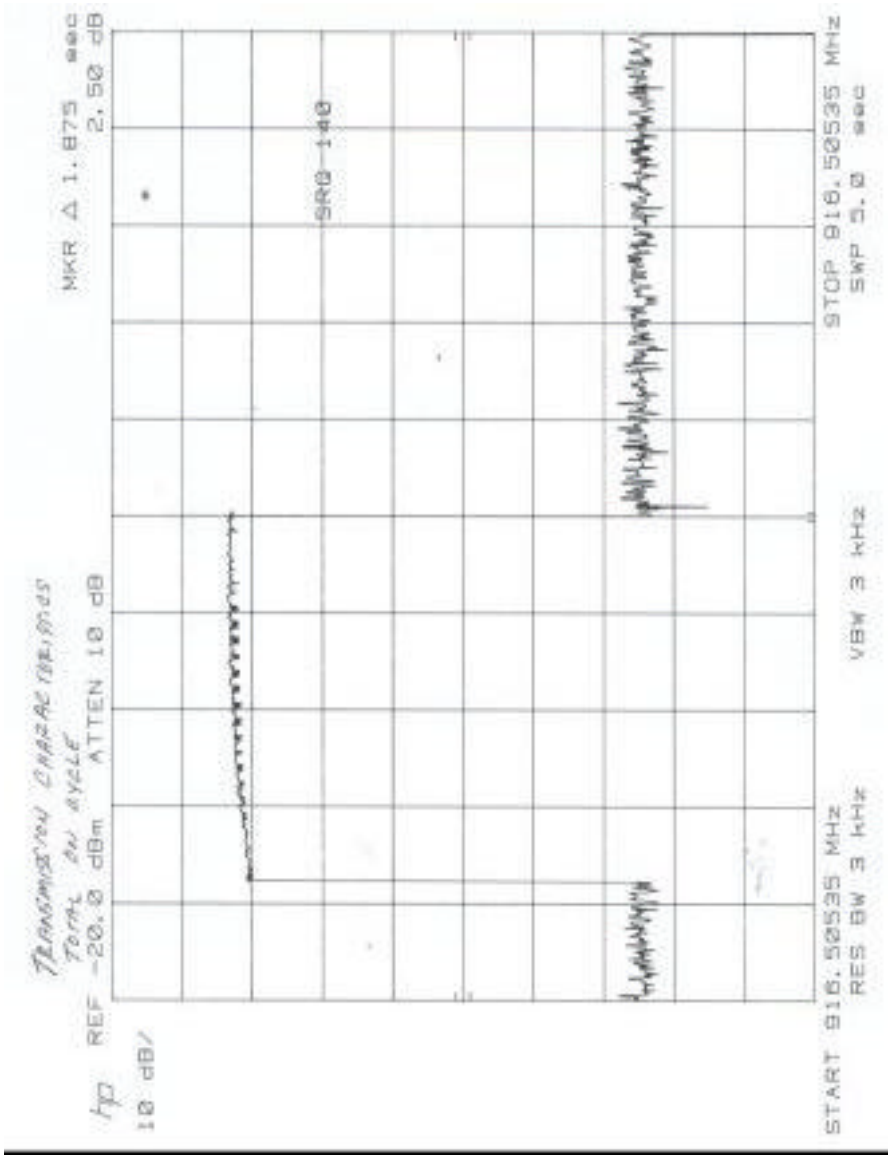
Pulse width / Time = Duty Cycle

Duty cycle correction factor = 10 log (duty cycle)

Actual plots showing on time versus off time are on pages 17 and 18.

		Time in ms	
Total on time per 100 ms		54.4	
Total off time per 100 ms		45.6	
Total duty cycle correction in dB		-2.64	


MKR Δ 5.400 msec
1.70 dB
REF -20.0 dBm
ATTEN 10 dB
10 dB/
STOP 916.50535 MHz
SWP 100 msec
VBW 3 kHz
START 916.50535 MHz
RES BW 3 kHz


Transmission Characteristics
Form 6a Cycle
hp
REF -20.0 dBm ATTEN 10 dB
10 dB/
MKR Δ 1.875 sec
2.50 dB
SRQ 140
START 916.52535 MHz
RES BW 3 kHz
VBW 3 kHz
STOP 918.52535 MHz
SWP 5.0 sec

3.1.7 Occupied Bandwidth

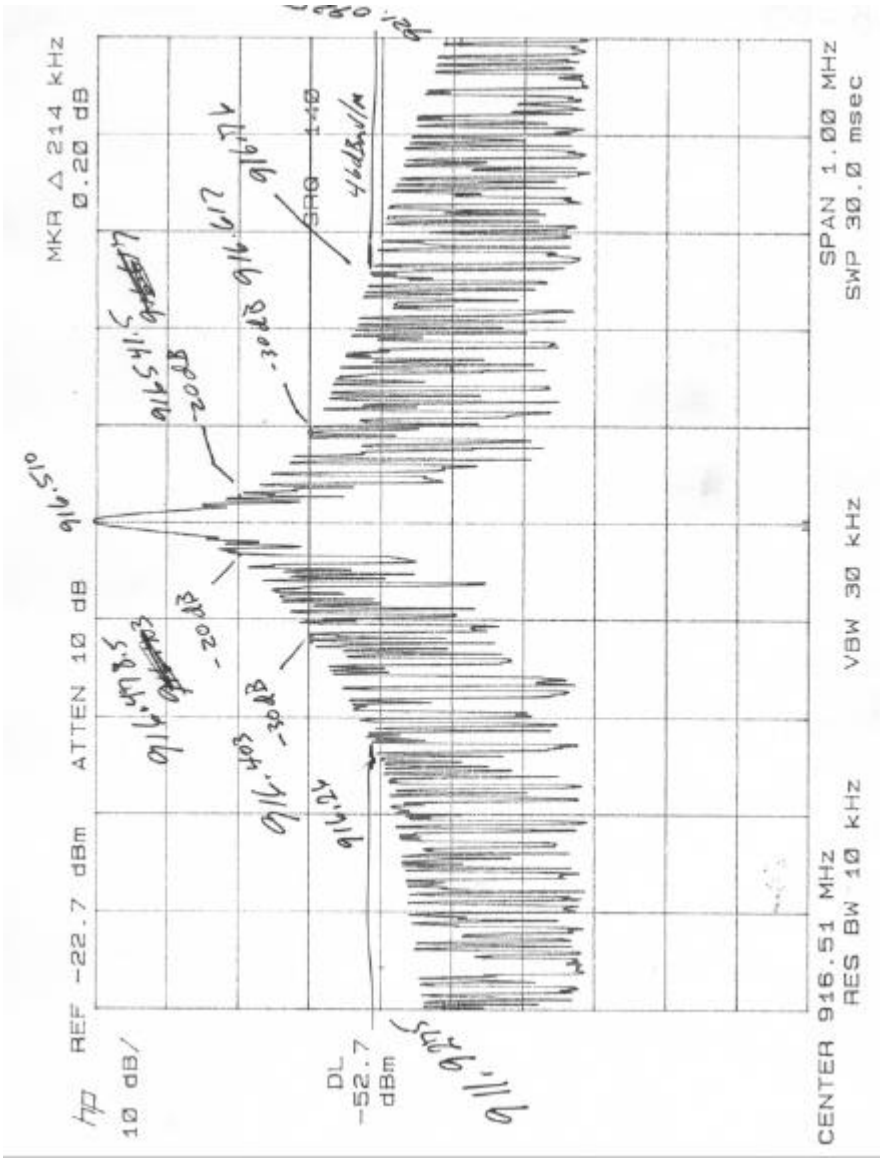
The transmitter's occupied bandwidth at (916.5 MHz) was measured with respect to the 20dB down point of the center frequency. Part 15.231 (c) stipulates that emissions shall be no wider than 0.5% of the center frequency for devices operating above 900 and shall be attenuated by at least 20 dB below the level of the fundamental or to the general radiated emission limits in Part 15.209, whichever is the lesser attenuation. Part 15.209 (a) specifies that the emissions from an intentional radiator shall not exceed the field strength levels in the 216 to 960 MHz band of 200 uV/m (46 dBuV/m).

When transmitting at 916.5 MHz, emissions measured at the 0.5% bandwidth of 916.5 MHz (band edge) were 45.1 dBuV/m (< 46 dBuV/m).

Lower band edge calculated as 911.9175 MHz
Lower 20dB down point is 916.4785 MHz (Between 911.92 and 921.10 MHz)
Transmitting signal fall below 37dBuV/m at 911.9275 MHz (<46 dBuV/m)

Upper band edge calculated as 921.0825 MHz
Upper 20dB down point is 916.5415 MHz (Between 911.92 and 921.10 MHz)
Transmitting signal falls below 37dBuV/m at 921.0925 MHz (<46 dBuV/m)

Plots showing the occupied bandwidth are provided on pages 20 – 31.


MKR Δ 214 kHz
0.20 dB
SPAN 1.00 MHz
SWP 30.0 msec
REF -22.7 dBm
ATTEN 10 dB
VBW 30 kHz
10 dB/
DL
-52.7
dBm
CENTER 916.51 MHz
RES BW 10 kHz

3.1.8 Photographs of Radiated Test Setup – per 2.1033(b)(7)

Radiated Emissions

Measurement of Frequency Stability

EUT was tested between –30 degrees C and + 50 degrees C and no frequency drift was observed.

EUT Power was reduced until either frequency instability was observed or until the signal ceased to transmit.

No frequency instability was observed.

Temp (C)	Voltage	Frequency (MHz)	Deviation (kHz)
-30.0	3.0	916.516	+1
-20.0	3.0	916.516	+1
-10.0	3.0	916.515	0
0.0	3.0	916.515	0
+10.0	3.0	916.515	0
+20.0	3.0	916.516	+1
+30.0	3.0	916.516	+1
+40.0	3.0	916.516	+1
+50.0	3.0	916.516	+1

Temp (C)	Voltage	Frequency (MHz)	Deviation (kHz)
20	2.55	916.517	0
20	3.00	916.517	0
20	3.45	916.517	0

4. LABELING REQUIREMENTS - PER 2.1033(B)(7)

Label will be constructed of 0.02-inch plastic attached as shown on the equipment with permanent adhesive.

All information on the label will be etched or screened. All methods will exceed the expected lifetime of the equipment.

The label will be large enough to allow all information to be readily legible.

4.1 Additional Label Required

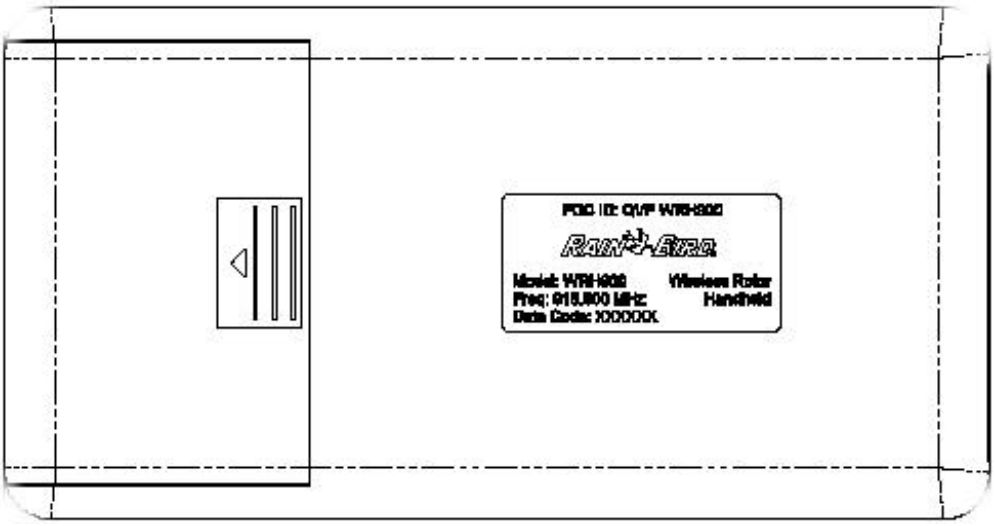
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Shown above is a copy of the label with the Part 15.19 Compliance Statement, Location of required information is checked “below”.

The label will be placed in a conspicuous location on the device.

4.2 Photograph of Label Placement and Contents

Because of the small size of this device the information in 4.1 may be placed in the documentation provided to the user. The FCC ID shall be placed upon the unit. This is in accordance with FCC Part 15.19 (a) (5).



5. SCHEMATIC DIAGRAMS

Please review attachments

UNCERTAINTY TOLERANCE

DNB Engineering's Riverside Facility (3 and 10 meter Open Area Test Sites) are within acceptable uncertainty tolerances per ANSI C63.4 (1992) sections 5.4.6.1 and 5.4.6.2.

ANSI C63.4 (1992)

5.4.6.1 Site Attenuation. A measurement site shall be considered acceptable for radiated electromagnetic field measurements if the horizontal and vertical NSA derived from measurements, i.e., the "measured NSA," are within ?4 dB of the theoretical NSA (5.4.6.3) for an ideal site.

5.4.6.1 NSA Tolerance. The ?4 dB tolerance in 5.4.6.1 includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies. These errors are analyzed in ANSI C63.6-1988 [3], wherein it is shown that the performance of a well-built site contributes only 1 dB of the total allowable tolerance.

INFORMATION PERTAINING TO EQUIPMENT MANUFACTURED AFTER COMPLIANCE TESTING

It is prudent that manufacturers have an established Quality Assurance program to spot check their products on a periodic basis, either based upon time or quantities produced. Obviously, a change in the engineering design should be sufficient justification for a re-test.

The Quality assurance test need not be formal Verification or Certification such as required during the initial production of the product. However, it should be sufficient in scope to assure that the EMI characteristics of the product have not changed to the degree that the product exceeds the FCC limits. If a new model of a product is produced, it must undergo full Verification or Certification testing and, in case of Certification, be filed with the FCC.

It is expected that the FCC will place greater emphasis and resources in spot checking commercially available products. If a product is found not to be compliant with the Limits specified in Part 15, Subpart B. the manufacturer will be subject to the appropriate penalties imposed by the Commission. The initial Certification or Verification is sufficient to justify initial production. The additional quality assurance testing performed is the manufacturer's responsibility to assure continued compliance.

Test Equipment Log

Item No:	Description	Manufacturer	M/N	S/N	Calibration Due Date	Test Equip Used On
1	Push/Pull Scale	Imada	MF	70403	5/30/03	
2	Power Analyzer	Voltech	PM3000A	1273	5/7/03	Harm / Flick
3	Digital MultiMeter	Chief Engineer	104	31220125	8/26/03	
4	Digital MultiMeter	Amprobe	AM-1250	330224	10/24/03	
5	LCR Meter	B & K Precision	878	23702237	10/24/03	
6	Digital MultiMeter	Amprobe	AM-1250	330139	8/6/03	
7	Dial Caliper	General MG	MG 6"	958	12/2/03	
8	Micrometer	General MG	1050C	959	12/2/03	
9	Impact Hammer	E.D. & D.	F22-50	9606235-3	11/6/03	
10	Process Meter	Newport	INFCP-210	4381880	4/5/03	
11	Process Meter	Newport	INFCP-210	6150730	4/5/03	
12	Oscilloscope	Tektronix	464	B133241	9/16/03	
13	Line Leakage Tester	Associated Research	510L	A130511	4/19/03	
14	Safety Compl Analyzer	Associated Research	7564SA	A100601	4/19/03	
15	AC/DC Current Probe	Amprobe	CT600	30301828	4/9/03	
16	Data Acquisition Unit	Hewlett Packard	34970A	US37017024	4/29/03	
17	Data Acquisition Unit	Hewlett Packard	34970A	US37016877	5/21/03	
18	Input Multiplexer	Hewlett Packard	34901A	US37017773	5/21/03	
19	Input Multiplexer	Hewlett Packard	34901A	US37017729	5/21/03	
20	Input Multiplexer	Hewlett Packard	34901A	US37019488	5/4/03	
21	Weather Station	Davis	7400	PC70804A01	1/29/03	All Tests
22	Safety Analyzer	Dynatech Nevada	431A	431A-1230	4/12/03	
23	SA - RF Section	Hewlett Packard	85680B	2330A02791	8/27/03	CE / RE / CS
24	SA - Display Section	Hewlett Packard	85662A	2318A05282	8/27/03	CE / RE / CS
25	RF Preselector	Hewlett Packard	85685A	2724A00659	8/26/03	CE / RE / CS
26	QP Adapter	Hewlett Packard	85650A	2811A01240	8/27/03	CE / RE / CS
27	SA - RF Section	Hewlett Packard	85680B	2049A01403	6/14/03	CE / RE / CS
28	SA - Display Section	Hewlett Packard	85662A	2112A02234	6/14/03	CE / RE / CS
29	QP Adapter	Hewlett Packard	85650A	2043A00184	6/14/03	CE / RE / CS
30	ESD Power Supply/Gun	Haefely	PSD 25 B	083 427-05	3/29/03	ESD
31	ESD Simulator	Haefely	PESD3000	H002033	6/13/03	ESD
32	Signal Source 9Khz-2Ghz	Marconi	2024	112231/034	2/2/03	RS / CS
33	Scale 300lb Capacity	Hanson	8930	1403	6/3/03	
34	Scale 25lb Capacity	Hanson	40	1402	4/26/03	
35	Precision Torque Gauge	SeeKonik	SL-12	967	7/9/03	
36	Precision Torque Wrench	Husky	39104	4980656019	7/18/03	
37	Step Attenuator 120dB	Hewlett Packard	355D	2522A43896	10/25/03	As Req'd
38	Step Attenuator 12dB	Hewlett Packard	355C	2524A42578	10/25/03	As Req'd
39	Oscilloscope	LeCroy	9400	85584	2/26/03	Surg / EFT/ ESD
40	Pressure Gauge	Ashcroft	0-30 PSI	1500	9/13/03	
41	Pressure Gauge	Ashcroft	0-30 PSI	1501	9/13/03	
42	Pressure Gauge	Ashcroft	0-30 PSI	1502	9/13/03	
43	Artificial Mains Network	Schwarzbeck	NNLA 8120	8120288	6/13/03	CE / CS
44	A.C. Leakage Current Tstr	Simpson	229-2	948	10/28/03	
45	Leakage Current tester	Simpson	228	709721	10/28/03	
46	Insulation Tester	Amprobe	AMB-1A	340055	10/28/03	
47	Hypot Tester	Beckman	P-2B	64999	10/29/03	
48	Ground Continuity Tester	Rod-I	M25	12485	10/29/03	
49	Digital MultiMeter	Di-log	DL-297T	23702237	11/13/03	
50	Probe	Omega	HX94V		4/5/03	
51	L I S N	ComPower Corp	L1-300	1331	5/13/03	CE / CS
52	L I S N	ComPower Corp	L1-300	1373	5/13/03	CE / CS

** When necessary, equivalent calibrated equipment may be substituted for the equipment listed here.*

Appendix A

Automated Engineering Corp.

SPECIFICATION

RAIN BIRD

Rain Bird's FS1 Handheld Transmitter

Document Title: Rain Bird FS1 Handheld Transmitter Specification
PCB Number: aw334
Firmware Number: sw080
AEC Assembly: EA231

1. PURPOSE AND SCOPE: This document contains specifications pertinent to the FS1 Handheld Transmitter. It covers General, Mechanical, and Electrical requirements, and Qualification.

2. DESCRIPTION: The FS1 Handheld board transmits commands on a frequency and protocol separate from the paging service.

3. SPECIFICATIONS:

3.1 **GENERAL AND ENVIRONMENTAL:**
- 3.1.1 Operating Temperature: 0°C to 70°C
- 3.1.2 Storage Temperature: -30°C to 80°C
- 3.1.3 Device Type: Computerized Configuration Tool
- 3.1.4 Operating Environment: Outdoor hand held

3.2 **MECHANICAL:**
- 3.2.1 Dimensions: Per aw334
- 3.2.2 Markings: Per aw334
- 3.2.3 Weight: 4.6oz (without batteries)

3.3 **ELECTRICAL:**
- 3.3.1 VOLTAGE
- 3.3.1.1 Power Source: 2 x AA alkaline primary batteries
- 3.3.1.3 Unit Operation: 2.2 Vdc to 3.2 Vdc
- 3.3.2 CURRENT
- 3.3.2.1 Normal Operation Current: 50mA typical
- 3.3.2.2 Backlight Current: additional 130mA typical
- 3.3.2.3 Transmit Current: additional 45mA typical
- 3.3.2.4 Off Current: 8uA typical
- 3.3.3 INPUTS
- 3.3.3.1 Four softkeys (function keys)
- 3.3.3.2 Twelve button keypad
- 3.3.3.3 Serial port
- 3.3.4 OUTPUTS
- 3.3.4.1 Liquid Crystal Display: 122x32 pixel (20x4 character)
- 3.3.4.2 RF local control (916.50MHz)
- 3.3.4.3 Serial port
- 3.3.5 MEMORY
- 3.3.5.1 2MByte Non-Volatile FLASH

4. OPERATION: (see handheld design document for more detailed functionality)
The Rain Bird FS1 Handheld transmitter sends CONFiguration and CoTRoL commands to the FS1 Rotor controller. The Configuration commands are to set the ID of the rotor (which includes passcode, capcode, and frequency). The Controls commands set the time and issue various rotor commands. Note, only the OEM TF048 version is capable of setting the VCO (Voltage Controlled Oscillator) calibration number.

5. QUALITY CONFORMANCE:

5.1 QUALIFICATION: Must be tested to this specification and application tested for operation. Each parameter and operating mode listed above must be tested, logged and compared to the specification.

5.2 TESTING: 100% per test procedure

REVISIONS

ISSUE	ORIGINATOR	SIGNATURE	DATE	REASON FOR CHANGE
011128	Mike Ware		11/28/01	Local RF specification update.
021220	Mike Ware		12/20/02	New current measurements.

Block Diagram

Please review attachments

User Manual

Please review attachments