FCC ID PER PART 15.231
EMI MEASUREMENT AND TEST REPORT

FOR

MINGXING ELECTRICAL APPLIANCES FACTORY

No. 1 Mingxing Electrical Road, Xia Shan
Chao Yang, GuangDong, China

FCC ID: O9WRL-39

September 29, 2000

This Report Concerns:	**Equipment Type:**
☒ Original Report	Wireless Digital Doorbell: Household Device

Test Engineer:	Victor Liu
Test Date:	September 18, 2000
Reviewed By:	John Y. Chan – Engineering Manager
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *MINGXING ELECTRICAL APPLIANCES FACTORY*, model *RL-39* or the "EUT" as referred to in this report is a 433.74MHz RF transmitter that is a wireless doorbell. The EUT transmits 433.74MHz signal.

The EUT measures 2.0" L x 1.0" W x 4.0" H.

1.2 Objective

This certification report is prepared on behalf of *MINGXING ELECTRICAL APPLIANCES FACTORY* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B, and C of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules, Part 15, sec 205, 209, and 231 for conducted and radiated margin.

1.3 Related Submittal(s)/Grant(s)

No Related Submittals

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 –1992, 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. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.5 Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Suite 2, Sunnyvale, California, USA.

Test sites at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-674 and R-657. The test sites has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program

(NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, IEC/CISPR 22: 1993, and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

1.6 Test Equipment List

Manufacturer	Description	Model	Serial Number	Cal. Due Data
HP	Spectrum Analyzer	8568B	2610A02165	12/6/00
HP	Spectrum Analyzer	8593B	2919A00242	12/20/00
HP	Amplifier	8349B	2644A02662	12/20/00
HP	Quasi-Peak Adapter	85650A	917059	12/6/00
HP	Amplifier	8447E	1937A01046	12/6/00
A.H. System	Horn Antenna	SAS0200/571	261	12/27/00
Com-Power	Log Periodic Antenna	AL-100	16005	11/2/00
Com-Power	Biconical Antenna	AB-100	14012	11/2/00
Solar Electronics	LISN	8012-50-R-24-BNC	968447	12/28/00
Com-Power	LISN	LI-200	12208	12/20/00
Com-Power	LISN	LI-200	12005	12/20/00
BACL	Data Entry Software	DES1	0001	12/20/00

1.7 Equipment Under Test (EUT)

Manufacturer	Description	Model	Serial Number	FCC ID
MINGXING ELECTRICAL APPLIANCES FACTORY	Wireless Doorbell	RL-39	N/A	O9WRL-39

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

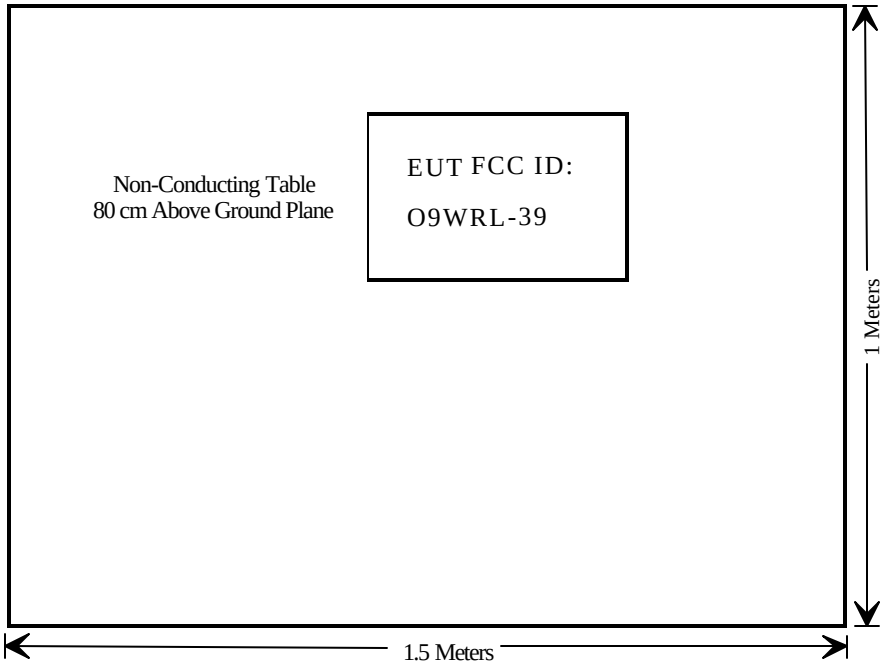
The EUT was configured for testing in a typical fashion (as normally used in a typical application).

The final qualification test was performed with the EUT operating at normal mode.

2.2 Block Diagram

Appendix A contains a copy of the EUT's block diagram as reference.

2.3 Test Setup Block Diagram



2.4 Equipment Modifications

No modifications were necessary for the EUT to comply.

3 - CONDUCTED EMISSIONS TEST DATA

Not applicable because of battery operation.

4 - RADIATED EMISSION DATA

4.1 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4 - 1992. The specification used was the FCC Class B limits.

The spacing between the peripherals was 10 cm.

External I/O cables are draped over edge of test table or bundled when necessary.

4.2 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR 15.33, since the internal processor speed operates between 108 MHz and 500 MHz, the EUT was tested to 2000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Start Frequency	30 MHz
Stop Frequency	2000 MHz
Sweep Speed	Auto
IF Bandwidth	100 KHz
Video Bandwidth	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

4.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (less than -4 dBµV), and are distinguished with a "**QP**" in the data table.

The EUT was operating at normal to represent worst case results during final qualification test. Therefore, this configuration was used for final test data recorded in the table(s) listed under section 4.7 of this report.

4.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBµV means the emission is 7dBµV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Limit

4.5 Summary of Test Results

According to the final data in section 4.6, the EUT complied with the FCC 15.231 (b) standards and these test results are deemed satisfactory evidence of compliance with RSS210 of the Canadian Interference-Causing Equipment Regulations, and had the worst margin of:

-13.2 dBmV at **433.74 MHz** in the **Vertical** polarization for Normal operating mode, 30 to 2000MHz, 3 meters.

4.6 Radiated Emissions Test Result Data

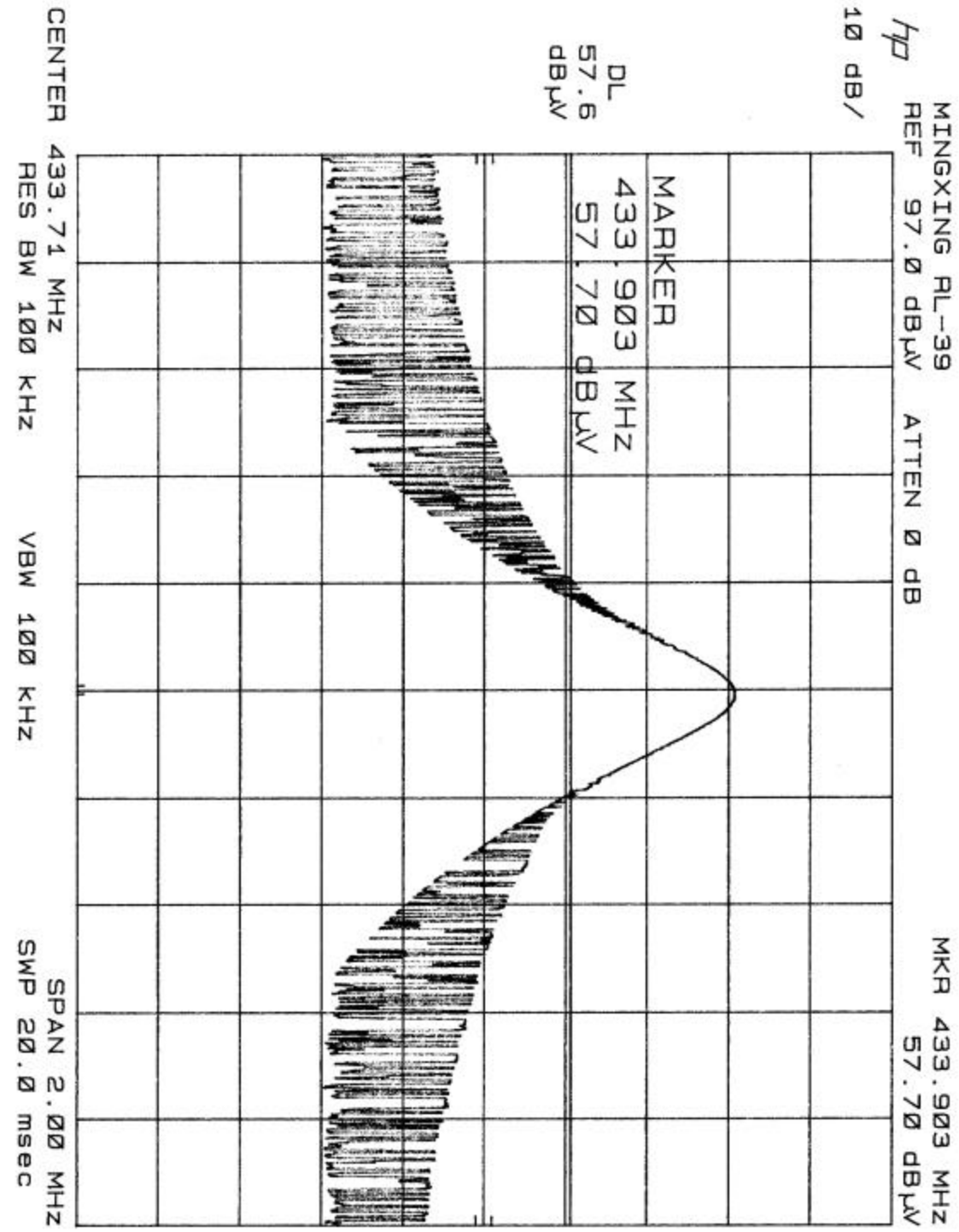
4.6.1 Final Test Data for Normal Operating Mode, 30 to 2000 MHz, 3 meters.

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15.231	
Freqency MHz	Ampl. dBmV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBmV/m	Cable dB	Amp. dB	Corr. Ampl. dBmV/m	Limit dBmV/m	Margin dB
433.74	67.9	0	3.5	v	17.5	2.9	20.7	67.6	80.8	-13.2
433.71	67.0	0	3.0	h	17.5	2.9	20.7	66.7	80.8	-14.1
36.00	31.3	45	1.0	v	13.3	0.5	19.9	25.2	40.0	-14.8
41.80	32.3	90	1.0	v	12.1	0.7	19.9	25.2	40.0	-14.8
867.42	40.2	0	2.5	h	23.7	4.5	22.6	45.8	60.8	-15.0
867.42	39.1	45	3.0	v	23.7	4.5	22.6	44.7	60.8	-16.1
1301.13	25.8	0	1.0	h	25.9	3.7	19.7	35.7	54.0	-18.3

Appendix A:

15.231C. 20dB bandwidth

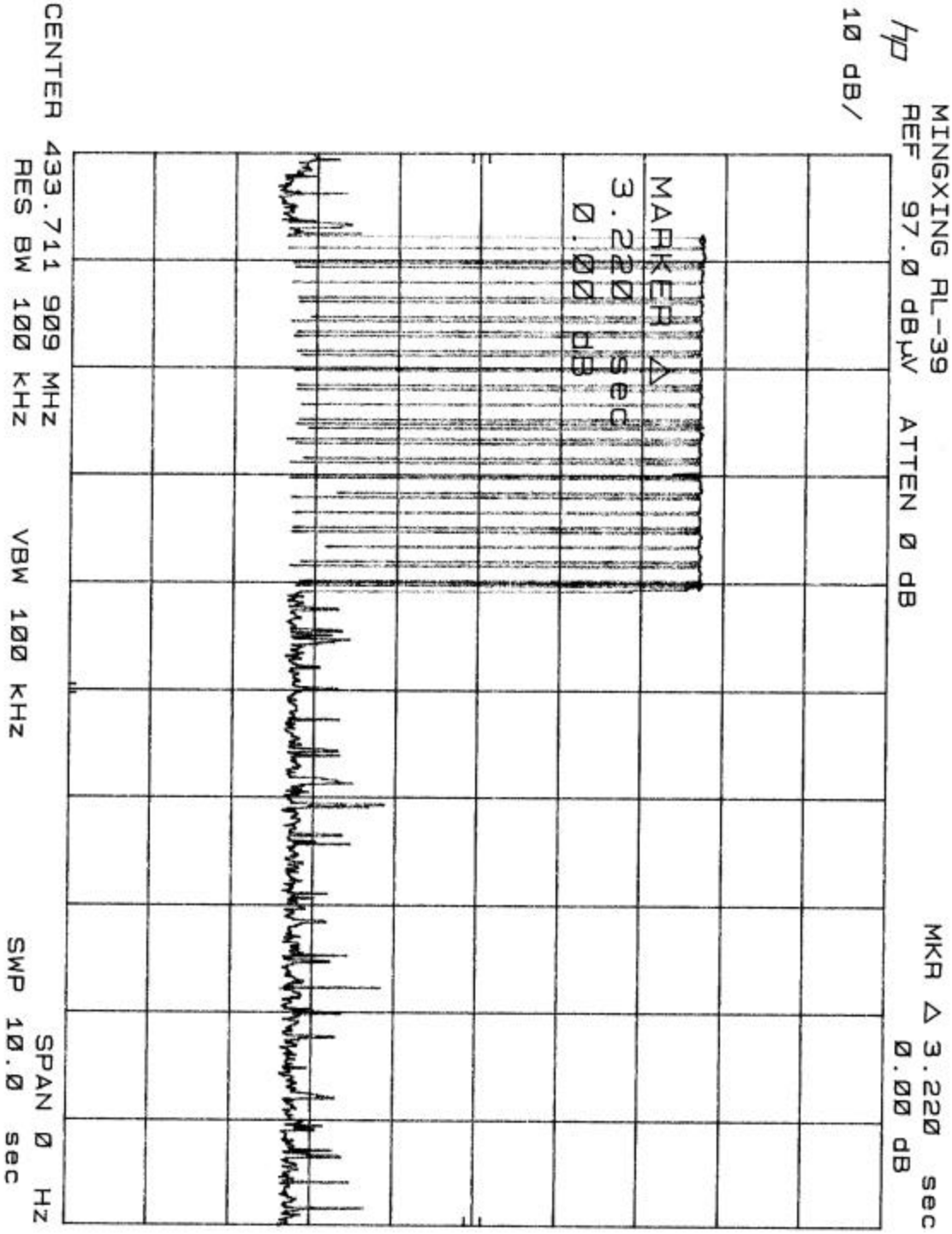
Result: Complies with the requirement. (364kHz < 0.25% of 433.903 MHz)


MINGXING RL-39
REF 97.0 dBµV ATTEN 0 dB
10 dB/
DL
57.6
dBµV
MARKER
433.903 MHz
57.70 dBµV
MKR 433.903 MHz
57.70 dBµV
CENTER 433.71 MHz
RES BW 100 KHz
VBW 100 KHz
SPAN 2.00 MHz
SWP 20.0 msec

Appendix B:

15.231(a). Activation time less than 5 seconds.

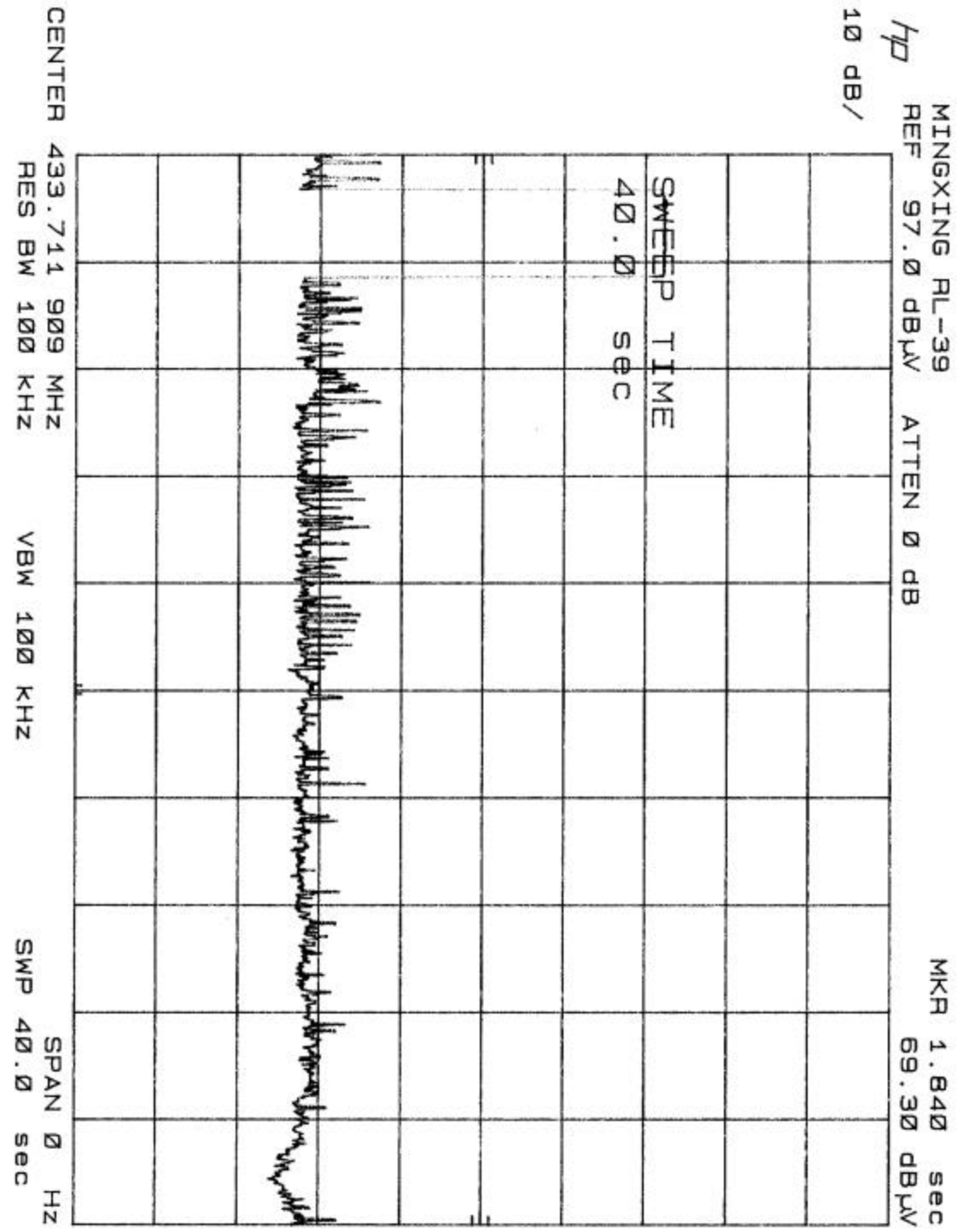
Result: Complies with the requirement.


MINGXING RL-39
REF 97.0 dBµV
ATTEN 0 dB
10 dB/
MARKER Δ
3.220 sec
0.00 dB
MKR Δ 3.220 sec
0.00 dB
CENTER 433.711 909 MHz
RES BW 100 kHz
VBW 100 kHz
SPAN 0 Hz
SWP 10.0 sec

Appendix C:

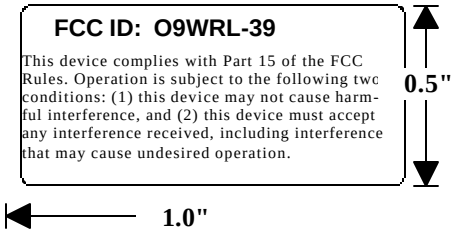
15.231(a). Periodic Transmissions at regular predetermined intervals are not permitted.

Result: Complies with the requirement. (The EUT will stop transmission within 5 seconds)


MINGXING RL-39
REF 97.0 dBµV ATTEN 0 dB
10 dB/
SWEEP TIME
40.0 sec
MKR 1.840 sec
69.30 dBµV
CENTER 433.711 909 MHz
RES BW 100 KHz
VBW 100 KHz
SPAN 0 Hz
SWP 40.0 sec

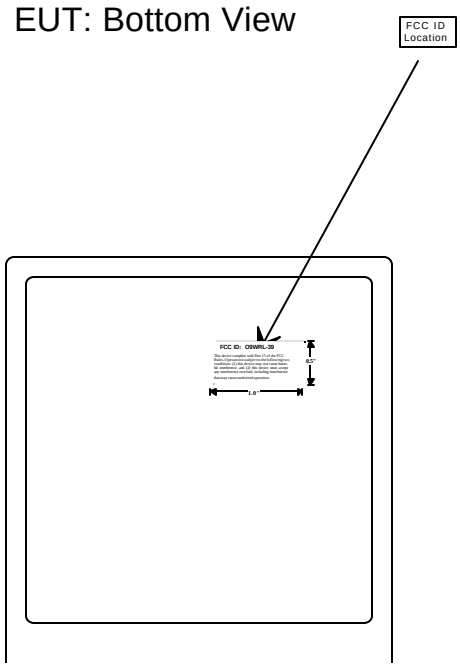
5– FCC PRODUCT LABELING AND WARNING STATEMENT

5.1 FCC ID Label



Specifications: Text is black in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT.

5.2 Proposed Label Location on EUT



5.3 FCC Warning Statement

The FCC Warning Statement is included in the product manual. A proposed sample of the statement is presented in Appendix C of this report as reference.

6 - Conducted and Radiated Setup Photographs

6.1 Radiated Emission Photograph – Front View

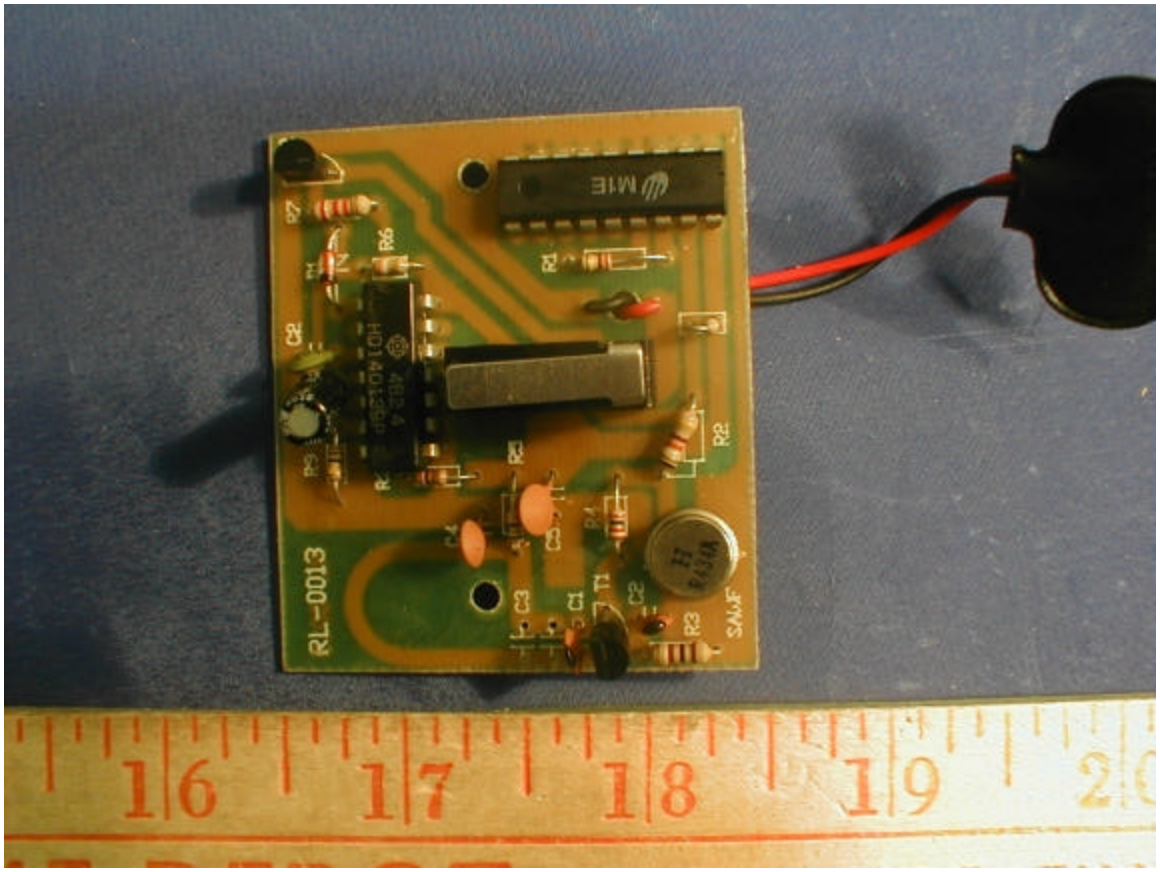
6.2 Radiated Emission Photograph – Rear View

7 – EUT PHOTOGRAPHS

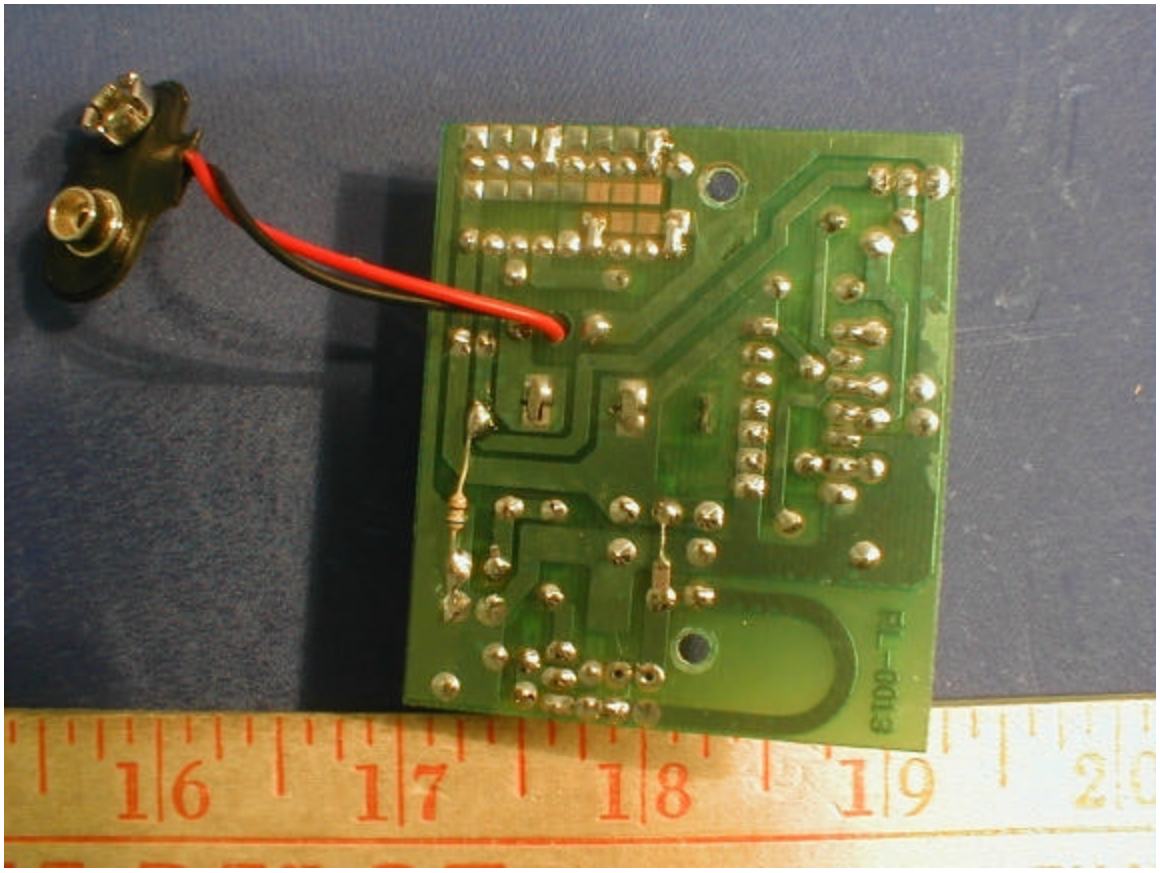
7.1 EUT: Top View

7.2 EUT: Rear View

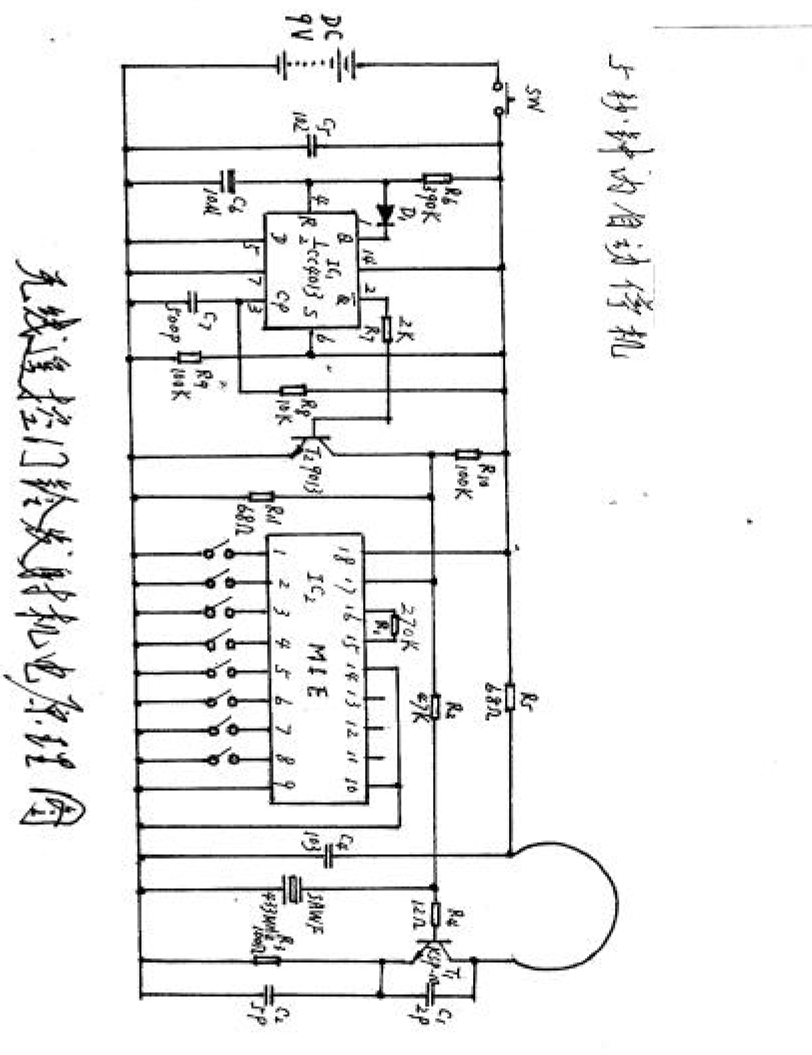
7.3 EUT: Circuit Board - Component View



7.4 EUT: Circuit Board - Circuit View



Appendix D –EUT BLOCK DIAGRAM /SCHEMATICS



Appendix E – USER MANUAL

FEATURES:

.Cordless Designs. No neccesities to dig holes and arrange the wires, avoiding the eletrical circuit bothersone of Laying out as well as paying-out, not affecting the decotating beauties.
.Remotely controlling from ultra-distances. The length reaches eighty metres.
Satisfying the requirements of high-stoueyed buildings.
.The sound is quite Loud, charming and ear-catching Presetting many sorts of sound for selections.

OPERATING INSTRUCTIONS

.The doorbell and the button's code must be matched.
.After the button is installed the nine-volt battery, using screws, glass glue or double-sided sponge paper sticher to fix at the gate, pull the antenna straightly (Make sure not to be too close to the metal things. If the door is hardware one, the arial cannot approach the metal). Preventing the rain from showening direrly. When not pressing, don't ecaiosg the power. The battery can be used for one yaer(Counting by twenty times daily).
.Open the battery lid of the doorbell the batteries. The batteries which you are invited would better alkalined ones.(Three No.5 batteries,"AA size". It is shorter in lives and easier to seep the electrolytes for using the oudinary batteries. There fore, they are not suitable to be used.) Exausing the power is extremely Low. The doorbell can be placed with your desires, or installed at any positions in the interior.
.After using for a long period of time, pleace change the batteries which are out of normal uses.

Appendix F – AGENCY AUTHORIZATION LETTER

MINGXING ELECTRICAL APPLIANCES FACTORY

AUG. 20 , 2000

FEDERAL COMMUNICATIONS COMMISSIONS

Authorization and Evaluation Division
7435 Oakland Mills Road0
Columbia, MD 21046

Subject: Agent Authorization

To whom it may concern:

MINGXING ELECTRICAL APPLIANCES FACTROY , hereby authorizes Bay Area Compliance Laboratory Corporation to act on its behalf in all maters relating to application for equipment authorization, including the signing of all documents relating to these matters. All acts carried out by Bay Area Compliance Laboratory Corporation on our behalf shall have the same effect as our own action.

Sincerely yours,