# EXHIBIT 5

TECHNICAL TEST REPORT

*FCC PART 15, SUBPART C*

*for*

# RADIO SHACK REMOTE CONTROL

## Model: 15-1935

Prepared for

RADIOSHACK, A DIVISION OF
TANDY CORPORATION
ONE TANDY CENTER,
100 THROCKMORTON STREET, SUITE 1300
FORTH WORTH, TEXAS 76102-2802

Prepared by: _____

KYLE FUJIMOTO

Approved by: _____

SCOTT McCUTCHAN

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: AUGUST 20, 1998

| | REPORT | APPENDICES | | TOTAL |
|---|---|---|---|---|
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| PAGES | 20 | 4 | 7 | 31 |

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| 1 | Plot Map And Layout of Test Site |

## GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Device Tested: Radio Shack Remote Control
Model: 15-1935
S/N: Pre-Production

Modifications: The EUT was not modified during the testing.

Customer: RadioShack, A Division of Tandy Corporation
One Tandy Center, 100 Throckmorton Street, Suite 1300
Fort Worth, Texas 76102-2802

Manufacturer: Universal Electronics, Inc.
6101 Gateway Drive
Cypress, California 90630-4841

Test Date: July 20, 1998

Test Specifications: EMI requirements
FCC Title 47, Part 15, Subpart C.
Test Procedure: ANSI C63.4: 1992

Test Deviations: The test procedure was not deviated from during the testing.

## SUMMARY OF TEST RESULTS

| TEST | DESCRIPTION | RESULTS |
|---|---|---|
| 1 | Radiated RF Emissions, 10 kHz - 4400 MHz. | Complies with the limits of sections **15.205 and 15.231** of FCC Title 47, Part 15, Subpart C |

## 1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) test performed on the Radio Shack Remote Control Model: 15-1935. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the limits of sections **15.205** and **15.231** of FCC Title 47, Part 15, Subpart C.

# 2. ADMINISTRATIVE DATA

## 2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California.

## 2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

## 2.3 Cognizant Personnel

RadioShack, A Division of Tandy Corporation

Dwayne Campbell Manager, Engineering and Regulatory Affairs

Universal Electronics, Inc.

Jesse Mendez Electrical Engineer

Compatible Electronics Inc.

Kyle Fujimoto Test Engineer
Scott McCutchan Lab Manager

## 2.4 Date Test Sample was Received

The test sample was received on July 20, 1998.

## 2.5 Disposition of the Test Sample

The test sample was returned to Universal Electronics, Inc. on July 20, 1998.

## 2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

| | |
|---|---|
| RF | Radio Frequency |
| EMI | Electromagnetic Interference |
| EUT | Equipment Under Test |
| P/N | Part Number |
| S/N | Serial Number |
| HP | Hewlett Packard |
| ITE | Information Technology Equipment |
| CML | Corrected Meter Limit |
| LISN | Line Impedance Stabilization Network |
| NVLAP | National Voluntary Laboratory Accreditation Program |

## 3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

| SPEC | TITLE |
|---|---|
| FCC Title 47, Part 15 1997 | FCC Rules - Radio frequency devices (including digital devices). |
| ANSI C63.4 1992 | Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz. |

# 4. DESCRIPTION OF THE TEST SAMPLE

## 4.1 Description of Test Configuration - EMI

The equipment under test (EUT) was placed on the wooden table. The EUT does not have any I/O ports and is battery operated. The antenna is a PCB trace.

Operating Conditions of the EUT

The EUT was investigated for emissions in the following operating mode:

1. The EUT was continuously transmitting.

Specifics of the EUT Tested

The Radio Shack Remote Control Model: 15-1935 was tested in three orthogonal axis. The emissions were found to be the highest when laying on its back and continuously transmitting. The final radiated data was taken at each transmit frequency as described above. All initial investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously.

4.1.1 **Cable Construction and Termination**

**The EUT has no cables.**

# 5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

## 5.1 EUT and Accessory List

| EQUIPMENT TYPE | MANU-FACTURER | MODEL | SERIAL NUMBER | FCC ID |
|---|---|---|---|---|
| RADIO SHACK REMOTE CONTROL (EUT) | UNIVERSAL ELECTRONICS, INC. | 15-1935 | Pre-Production | AAO1501935 |

## 5.2 EMI Test Equipment

| EQUIPMENT TYPE | MANU-FACTURER | MODEL NUMBER | SERIAL NUMBER | CAL. DATE | CAL. CYCLE |
|---|---|---|---|---|---|
| Spectrum Analyzer | Hewlett Packard | 8566B | 3701A22262 | December 9, 1997 | 1 Year |
| Preamplifier | Com Power | PA-102 | 1017 | February 16, 1998 | 1 Year |
| Quasi-Peak Adapter | Hewlett Packard | 85650A | 3303A01688 | June 23, 1998 | 1 Year |
| RF Attenuator | Com-Power | A-410 | 1602 | November 25, 1997 | 1 Year |
| LISN | Com Power | LI-200 | 1764 | January 3, 1998 | 1 Year |
| LISN | Com Power | LI-200 | 1771 | January 3, 1998 | 1 Year |
| LISN | Com Power | LI-200 | 1775 | January 3, 1998 | 1 Year |
| LISN | Com Power | LI-200 | 1780 | January 3, 1998 | 1 Year |
| Biconical Antenna | Com Power | AB-100 | 1548 | March 24, 1998 | 1 Year |
| Log Periodic Antenna | Com Power | AL-100 | 1117 | December 11, 1997 | 1 Year |
| Antenna Mast | Com Power | AM-100 | N/A | N/A | N/A |
| Turntable | Com Power | TT-100 | N/A | N/A | N/A |
| Computer | Hewlett Packard | HP98561A | 2522A05178 | N/A | N/A |
| Printer | Hewlett Packard | 2225A | 2925S33268 | N/A | N/A |
| Plotter | Hewlett Packard | 7440A | 8726K38417 | N/A | N/A |
| Microwave Amplifier | Com-Power | PA-122 | 001 | March 31, 1998 | N/A |
| Horn Antenna | Antenna Research | DRG-118/A | 1053 | December 8, 1995 | N/A |
| Loop Antenna | Com-Power | AL-130 | 25309 | February 5, 1998 | 1 Year |

# 6. TEST SITE DESCRIPTION

## 6.1 Test Facility Description

Please refer to section 2.1 of this report for EMI test location.

## 6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

# 7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests.

## 7.1 RF Emissions

### 7.1.1 Radiated Emissions and Bandwidth Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com Power Microwave Amplifier Model: PA-122 was used for frequencies for frequencies above 1 GHz. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps. The quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets. The measurement bandwidths and transducers used for the radiated emissions test were:

| FREQUENCY RANGE | EFFECTIVE MEASUREMENT BANDWIDTH | TRANSDUCER |
|---|---|---|
| 10 kHz to 150 kHz | 200 Hz | Active Loop Antenna |
| 150 kHz to 30 MHz | 9 kHz | Active Loop Antenna |
| 30 MHz to 300 MHz | 120 kHz | Biconical Antenna |
| 300 MHz to 1 GHz | 120 kHz | Log Periodic Antenna |
| 1 GHz to 4.4 GHz | 1 MHz | Horn Antenna |

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 1992. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data.

The -20 dB bandwidth was checked to see that it was within 0.25% of the fundamental frequency for each transmitter. A plot of the -20 dB bandwidth is on page 15A.

## SECTION 7.1.1.1

# *RADIATED EMISSIONS DATA SHEETS*

COMPATIBLE ELECTRONICS

FCC ID: AAO1501935



# RADIATED EMISSIONS

COMPANY NAME: UNIVERSAL ELECTRONICS, INC. DATE: 7-20-98

EUT: RADIO SHACK REMOTE CONTROL EUT S/N: PRE-PRODUCTION

EUT MODEL: 15-1935 LOCATION: ■ BREA □ SILVERADO □ AGOURA

SPECIFICATION: FCC 15.231 CLASS: _____ TEST DISTANCE: 3M LAB: D

ANTENNA: ■ LOOP ■ BICONICAL ■ LOG □ HORN POLARIZATION: ■ VERT ■ HORIZ

■ QUALIFICATION □ ENGINEERING □ MFG. AUDIT ENGINEER: KYLE F.

NOTES: SPURIOUS EMISSIONS

| Frequency (MHz) | Peak Reading (dBuV) | Quasi-Peak (dBuV) | Antenna Height (meters) | Azimuth (degrees) | Antenna Factor (dB) | Effective Gain (dB) | * Corrected Reading (dBuV) | Delta ** (dB) | Spec Limit (dBuV) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | NO | SPURIOUS | | EMISSIONS | | | |
| | | | FOUND | IN EITHER | | POLARIZATION | | | |
| | | | FROM | 10KHZ - 1000 MHz. | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

* **CORRECTED READING** = METER READING + ANTENNA FACTOR - EFFECTIVE GAIN

** **DELTA** = CORRECTED READING - SPECIFICATION LIMIT

# COMPATIBLE ELECTRONICS — RADIATED EMISSIONS — FCC ID: AAO1501935

**COMPANY NAME:** UNIVERSAL ELECTRONICS, INC. **DATE:** 7-20-98

**EUT:** RADIO SHACK REMOTE CONTROL **EUT S/N:** PRE-PRODUCTION

**EUT MODEL:** 15-1935 **LOCATION:** ■ BREA ☐ SILVERADO ☐ AGOURA

**SPECIFICATION:** FCC 15.231 **CLASS:** ____ **TEST DISTANCE:** 3M **LAB:** D

**ANTENNA:** ☐ LOOP ☐ BICONICAL ■ LOG ■ HORN **POLARIZATION:** ■ VERT ☐ HORIZ

■ QUALIFICATION ☐ ENGINEERING ☐ MFG. AUDIT **ENGINEER:** KYLE F.

**NOTES:** DUTY CYCLE = 11.775% 20 LOG 11.475% = 18.6 dB DROP (AVG)

| Frequency (GHz) | Peak Reading (dBuV) | Average Reading (dBuV) | Antenna Height (meters) | Azimuth (degrees) | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | * Corrected Reading (dBuV) | Delta ** (dB) | Spec Limit (dBuV) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| .430 | 89.9 | 71.3 | 1.0 | 90 | 15.9 | 2.1 | 38.3 | 54.0 | -26.3 | 80.3 | |
| .860 | 76.9 | 58.3 | 1.0 | 180 | 20.0 | 4.2 | 38.0 | 44.5 | -15.8 | 60.3 | |
| 1.290 | 57.7 | 39.1 | 1.0 | 90 | 22.3 | 4.2 | 32.9 | 32.7 | -27.6 | 60.3 | |
| 1.720 | 51.1 | 32.5 | 2.0 | 0 | 24.5 | 5.5 | 33.0 | 29.5 | -24.5 | 54.0 | X |
| 2.150 | 55.1 | 36.5 | 2.0 | 270 | 26.7 | 4.8 | 33.1 | 34.9 | -25.4 | 60.3 | |
| 2.580 | 51.5 | 32.9 | 2.0 | 270 | 28.2 | 5.5 | 32.7 | 33.9 | -26.4 | 60.3 | |
| 3.010 | 49.6 | 31.0 | 1.0 | 270 | 29.7 | 6.4 | 32.4 | 34.7 | -25.6 | 60.3 | |
| 3.440 | 38.4 | 19.8 | 2.0 | 180 | 29.6 | 6.9 | 32.1 | 24.2 | -29.8 | 54.0 | |
| 3.870 | 38.0 | 19.4 | 1.0 | 180 | 29.5 | 8.2 | 31.8 | 25.3 | -28.7 | 54.0 | X |
| 4.300 | 38.5 | 19.9 | 1.0 | 180 | 30.9 | 8.6 | 31.5 | 27.9 | -26.1 | 54.0 | X |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = CORRECTED READING - SPECIFICATION LIMIT

COMPATIBLE ELECTRONICS **RADIATED EMISSIONS** FCC ID: AAO1501935

COMPANY NAME: UNIVERSAL ELECTRONICS, INC. DATE: 7-20-98

EUT: RADIO SHACK REMOTE CONTROL EUT S/N: PRE-PRODUCTION

EUT MODEL: 15-1935 LOCATION: ■ BREA ☐ SILVERADO ☐ AGOURA

SPECIFICATION: FCC 15.231 CLASS: ____ TEST DISTANCE: 3M LAB: D.

ANTENNA: ☐ LOOP ☐ BICONICAL ■ LOG ■ HORN POLARIZATION: ☐ VERT ■ HORIZ

■ QUALIFICATION ☐ ENGINEERING ☐ MFG. AUDIT ENGINEER: KYLE F.

NOTES: DUTY CYCLE = 11.745% 20 LOG 11.745% = 18.6dB DATA (AVG)

| Frequency (GHz) | Peak Reading (dBuV) | Average Reading (dBuV) | Antenna Height (meters) | Azimuth (degrees) | Antenna Factor (dB) | Cable Loss (dB) | Amplifier Gain (dB) | * Corrected Reading (dBuV) | Delta ** (dB) | Spec Limit (dBuV) |
|---|---|---|---|---|---|---|---|---|---|---|
| .430 | 102.2 | 83.6 | 1.0 | 270 | 15.9 | 2.1 | 38.3 | 63.3 | -17.0 | 80.3 |
| .860 | 76.3 | 57.7 | 3.5 | 270 | 20.0 | 4.2 | 38.0 | 43.9 | -16.4 | 60.3 |
| 1.290 | 58.1 | 39.5 | 1.0 | 270 | 22.3 | 4.2 | 32.9 | 33.1 | -27.2 | 60.3 |
| 1.720 | 47.3 | 28.7 | 1.0 | 90 | 24.5 | 5.5 | 33.0 | 25.7 | -28.3 | 54.0 |
| 2.150 | 51.5 | 32.9 | 1.0 | 90 | 33.1 | 4.8 | 26.7 | 44.1 | -16.2 | 60.3 |
| 2.580 | 51.5 | 32.9 | 1.5 | 270 | 32.7 | 5.5 | 28.2 | 42.9 | -17.4 | 60.3 |
| 3.010 | 44.1 | 25.5 | 2.5 | 180 | 29.7 | 6.4 | 32.4 | 29.2 | -31.1 | 60.3 |
| 3.440 | 40.4 | 21.8 | 1.0 | 90 | 29.6 | 6.9 | 32.1 | 26.2 | -27.8 | 54.0 |
| 3.870 | 40.2 | 21.6 | 1.0 | 180 | 29.5 | 8.2 | 31.8 | 27.5 | -26.5 | 54.0 |
| 4.300 | 39.0 | 20.4 | 1.0 | 180 | 30.9 | 8.6 | 31.5 | 28.4 | -25.6 | 54.0 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

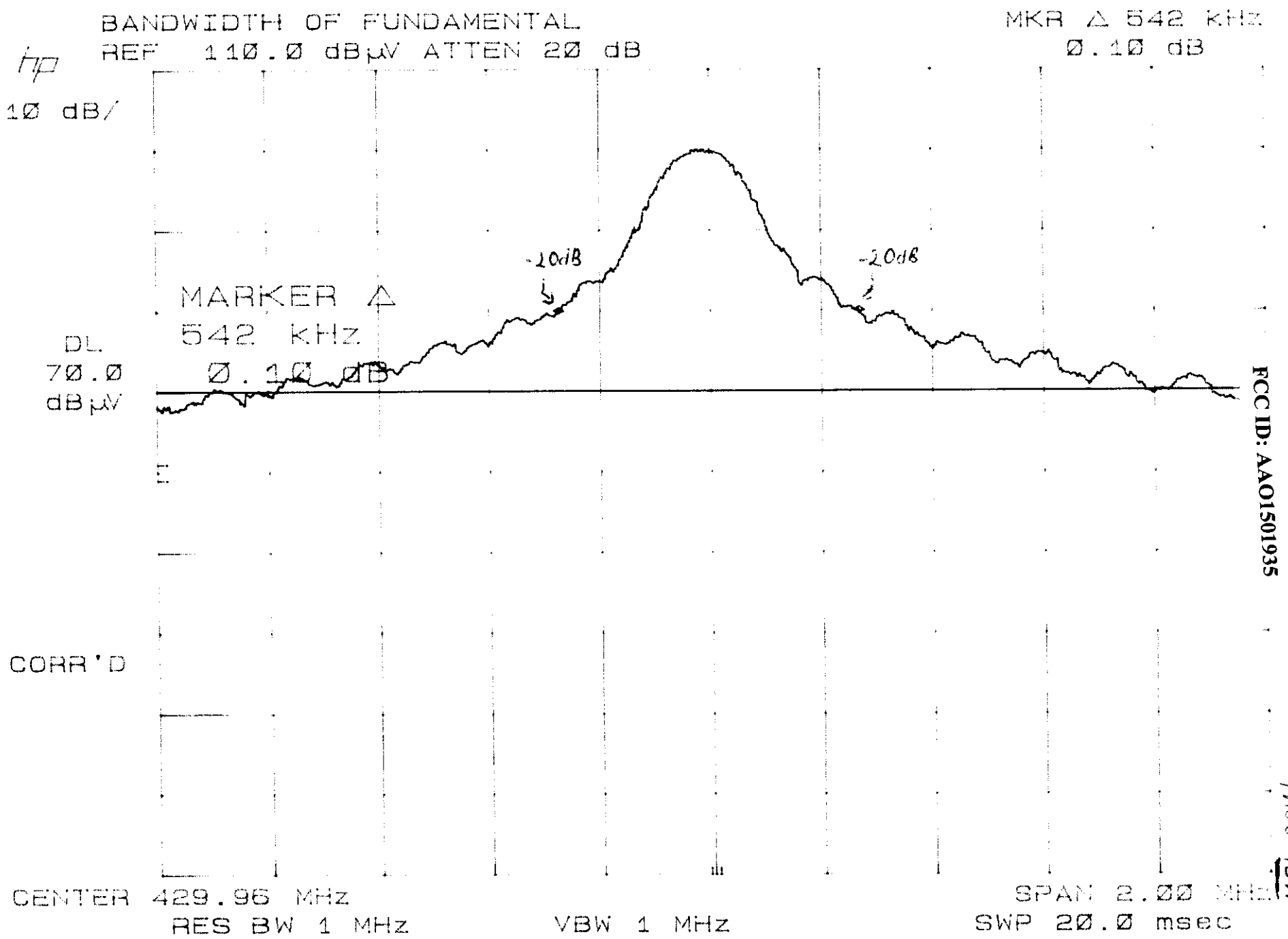
* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = CORRECTED READING - SPECIFICATION LIMIT

## SECTION 7.1.1.2

# *PLOT OF THE –20DB BANDWIDTH OF THE FUNDAMENTAL*

7-20-98




FCC ID: AAO1501935

PAGE 15A

## 8. CONCLUSIONS

The Radio Shack Remote Control Model: 15-1935 meets all of the specification limits defined in FCC Title 47, Part 15, Subpart C, sections **15.205** and **15.231**.

# APPENDIX A

# *TEST SETUP DIAGRAM AND PHOTOS*

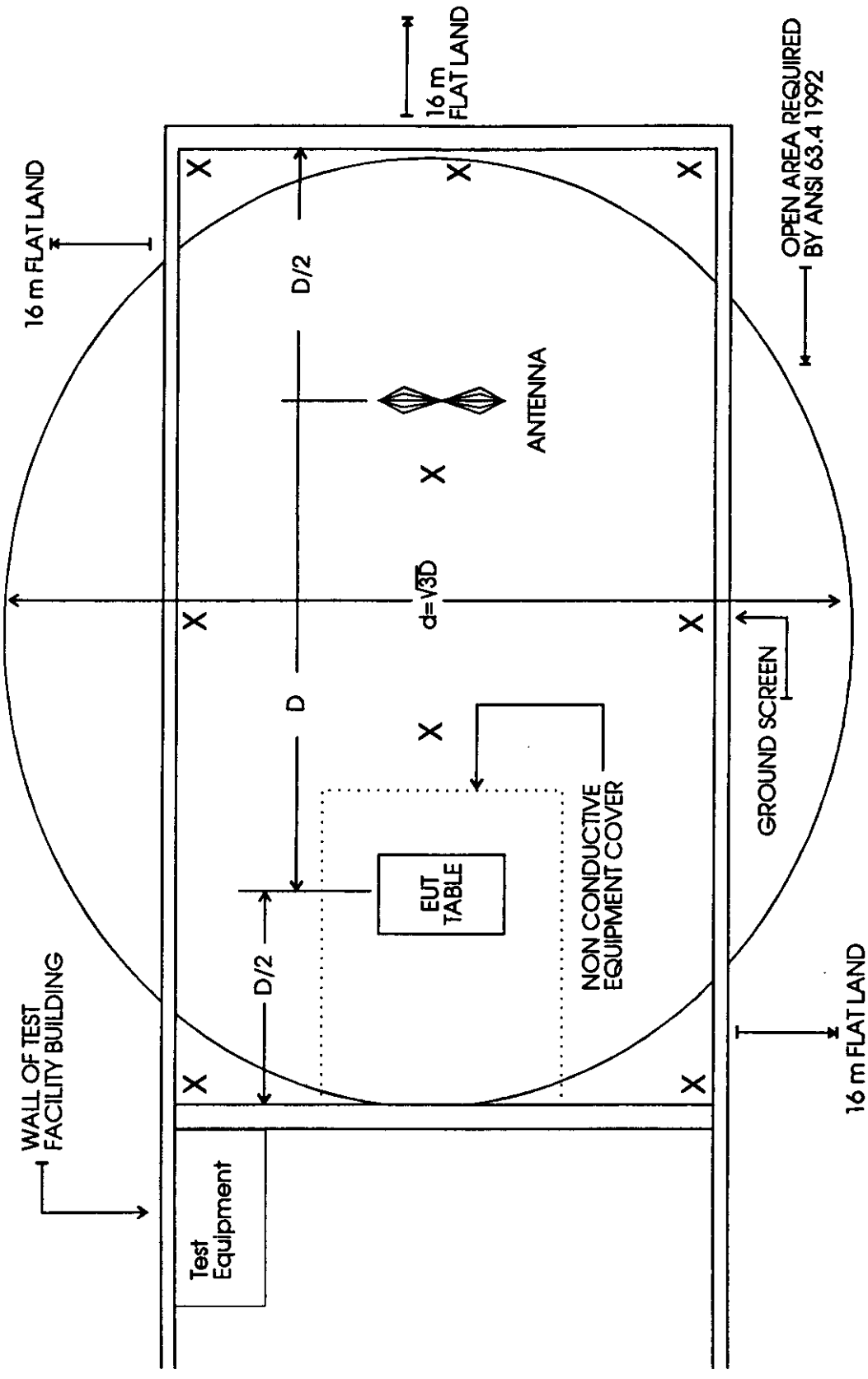
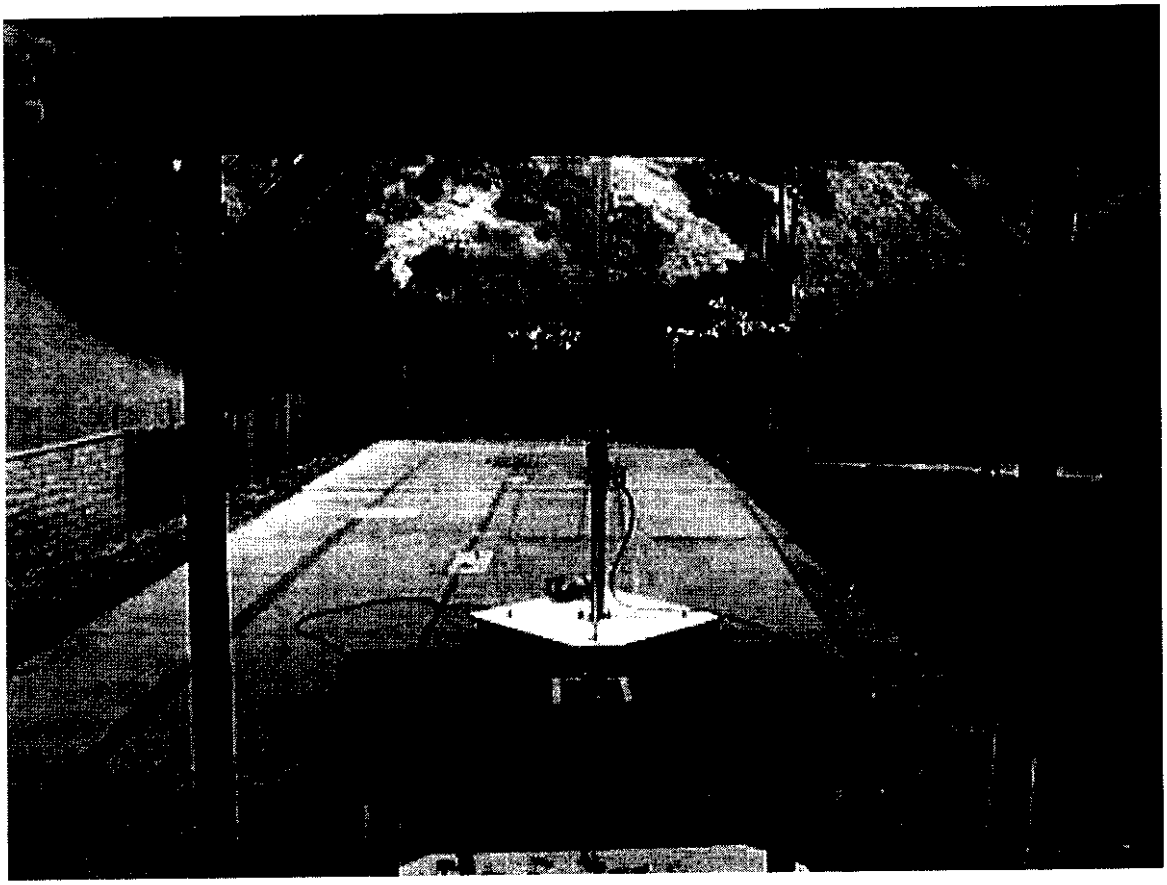


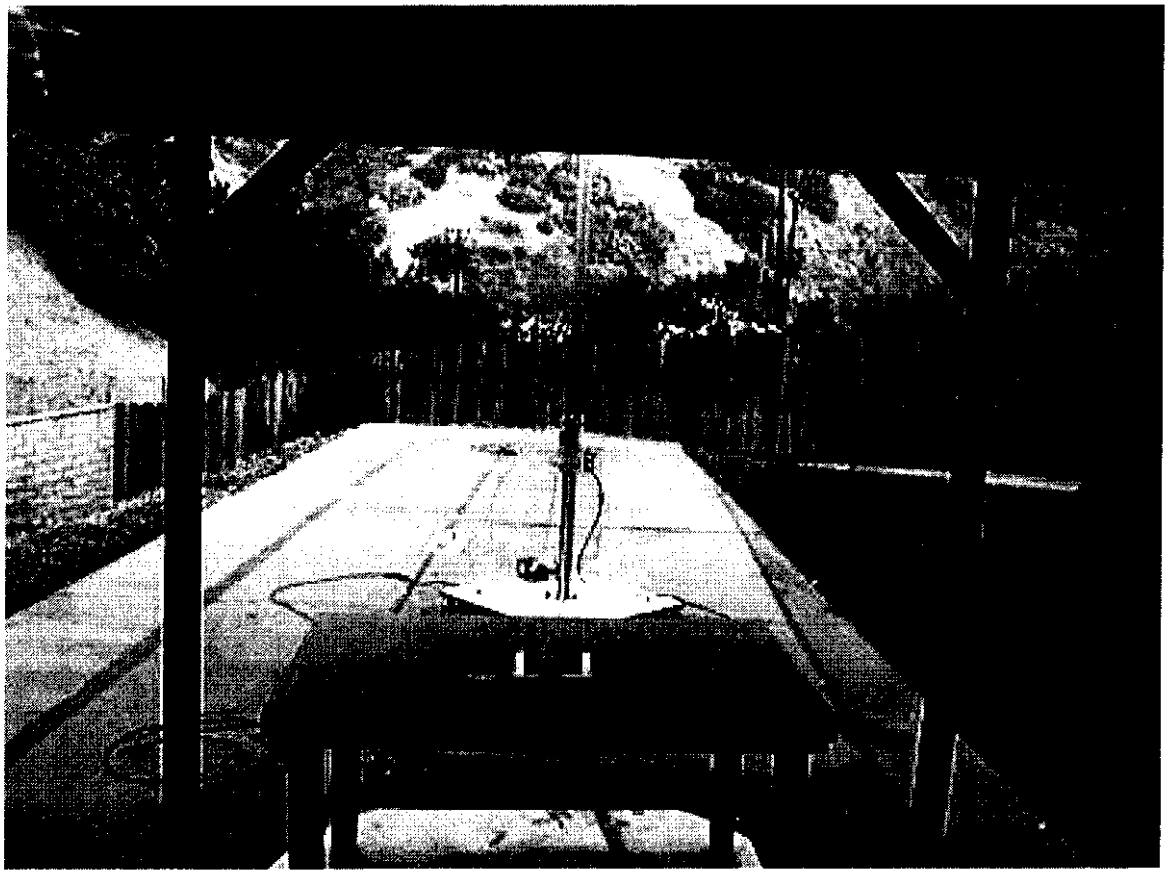

Figure 1: Plot Map and Layout of Test Site D



**FRONT VIEW**

UNIVERSAL ELECTRONICS, INC.
RADIO SHACK REMOTE CONTROL
Model: 15-1935
FCC SUBPART C - RADIATED EMISSIONS –7-20-98

## PHOTOGRAPHS SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



**REAR VIEW**

UNIVERSAL ELECTRONICS, INC.
RADIO SHACK REMOTE CONTROL
Model: 15-1935
FCC SUBPART C - RADIATED EMISSIONS – 7-20-98

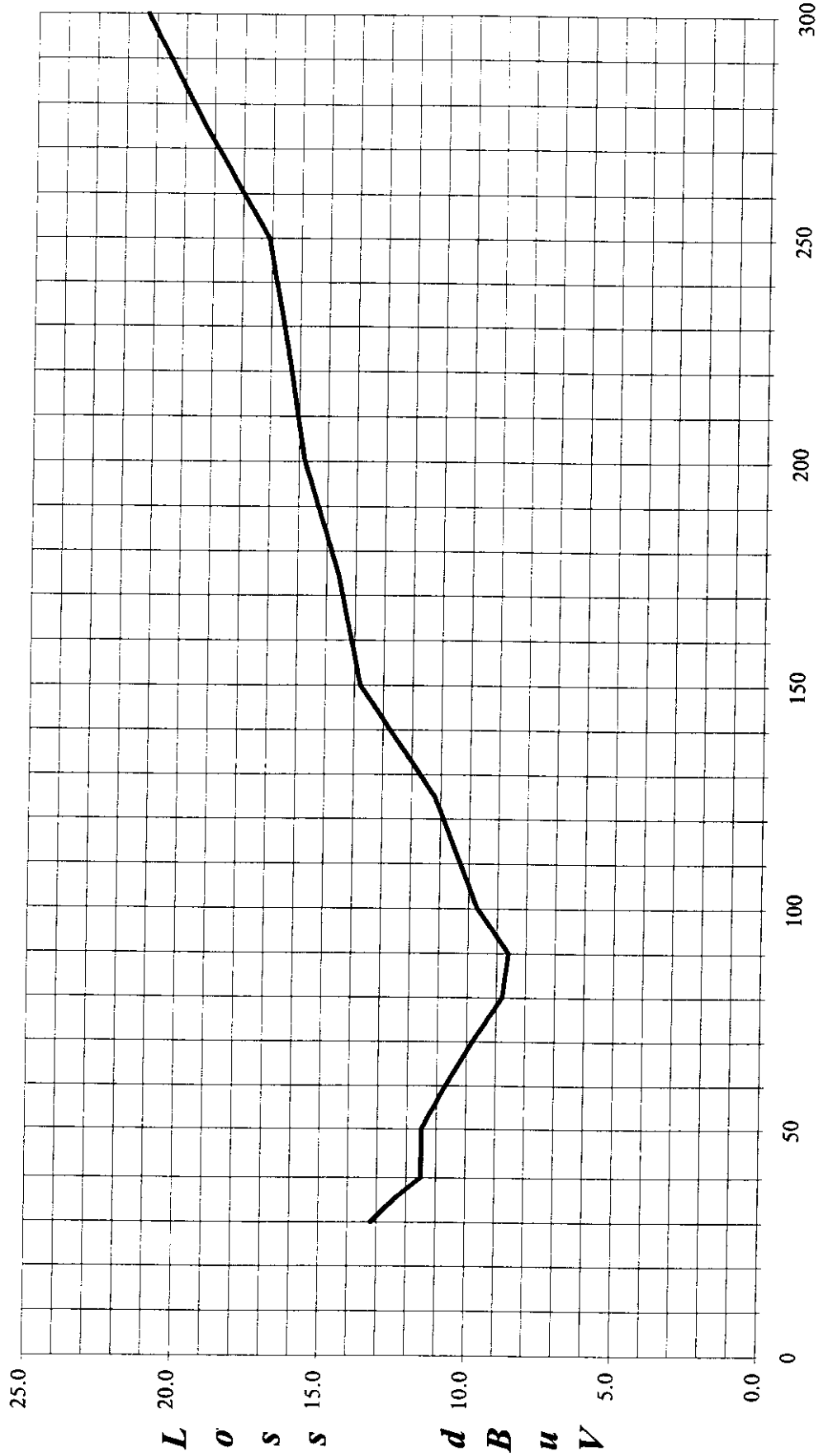
## PHOTOGRAPHS SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

# APPENDIX B

# *ANTENNA FACTORS AND EFFECTIVE GAIN FACTORS*

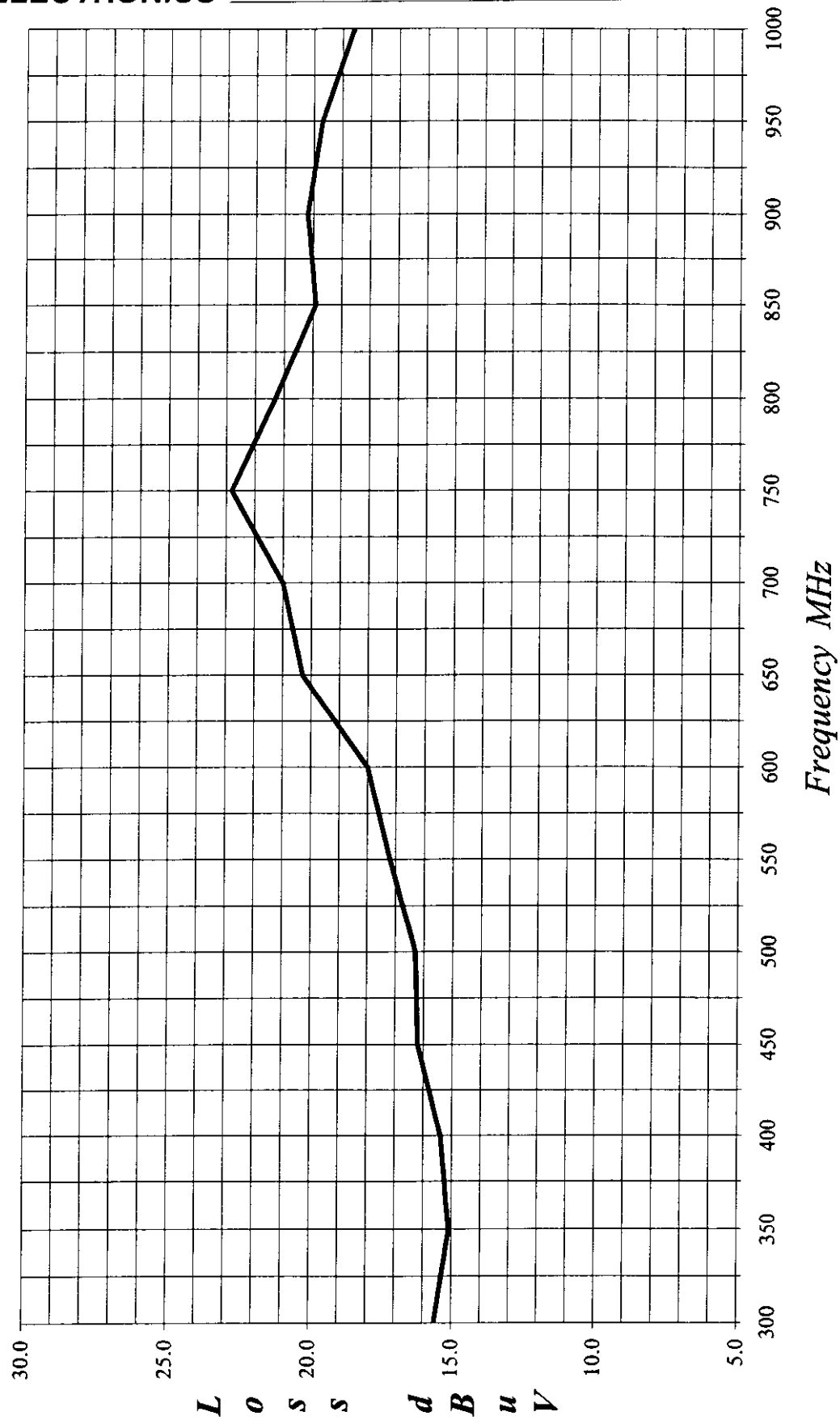
Cal: 3/24/98

## LAB "D" BICONICAL ANTENNA AB-100 S/N 01548



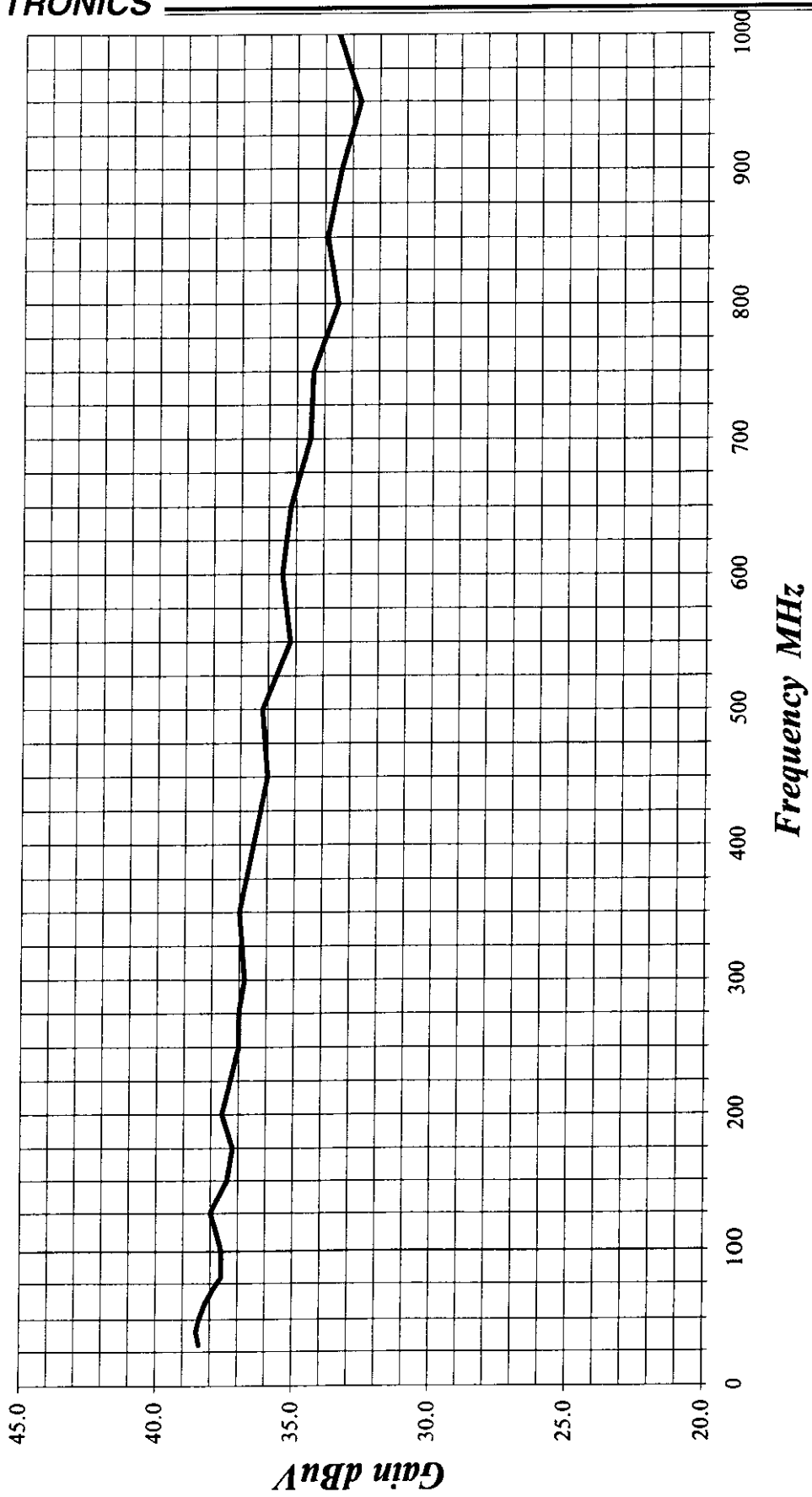
Cal: 12/11/97

# LAB "D" LOG PERIODIC ANTENNA AL-100 S/N 01117



Lab "D" Effective: 2/16/98 Effective Gain = Preamplifier Gain - Cable Loss

# PREAMPLIFIER EFFECTIVE GAIN AT 3 METERS PA-102 S/N: 1017



# COM-POWER PA-122

# MICROWAVE PREAMPLIFIER

## S/N: 001

## CALIBRATION DATE: MARCH 31, 1998

| FREQUENCY (GHz) | FACTOR (dB) | FREQUENCY (GHz) | FACTOR (dB) |
|---|---|---|---|
| 1.0 | 33.0 | 8.0 | 31.4 |
| 1.1 | 33.0 | 8.5 | 30.5 |
| 1.2 | 32.9 | 9.0 | 31.4 |
| 1.3 | 32.9 | 9.5 | 32.6 |
| 1.4 | 32.8 | 10.0 | 33.1 |
| 1.5 | 32.7 | 10.5 | 32.1 |
| 1.6 | 33.0 | 11.0 | 31.0 |
| 1.7 | 33.0 | 11.5 | 31.0 |
| 1.8 | 33.1 | 12.0 | 30.9 |
| 1.9 | 32.9 | 12.5 | 30.9 |
| 2.0 | 33.1 | 13.0 | 30.4 |
| 2.5 | 32.7 | 13.5 | 31.0 |
| 3.0 | 32.4 | 14.0 | 29.3 |
| 3.5 | 32.1 | 14.5 | 28.5 |
| 4.0 | 31.8 | 15.0 | 27.6 |
| 4.5 | 31.5 | 15.5 | 27.6 |
| 5.0 | 31.6 | 16.0 | 27.3 |
| 5.5 | 32.0 | 16.5 | 29.3 |
| 6.0 | 31.6 | 17.0 | 30.4 |
| 6.5 | 32.0 | 17.5 | 31.1 |
| 7.0 | 31.4 | 18.0 | 29.7 |
| 7.5 | 32.0 | 18.5 | 29.3 |

ANTENNA RESEARCH ASSOCIATES, INC.
11317 Frederick Avenue, Beltsville, MD 20705

FCC ID: AAO1501935

## E-FIELD ANTENNA FACTOR CALIBRATION

E(dB V/m) = Vo(dB V) + AFE(dB/m)

Model number : DRG-118/A

| Frequency GHz | AFE dB/m | Gain dBi |
|---|---|---|
| 1 | 22.3 | 8.0 |
| 2 | 26.7 | 9.5 |
| 3 | 29.7 | 10.1 |
| 4 | 29.5 | 12.8 |
| 5 | 32.3 | 12.0 |
| 6 | 32.4 | 13.4 |
| 7 | 36.1 | 11.0 |
| 8 | 37.4 | 10.9 |
| 9 | 36.8 | 12.5 |
| 10 | 39.5 | 10.7 |
| 11 | 39.6 | 11.5 |
| 12 | 39.8 | 12.0 |
| 13 | 39.7 | 12.8 |
| 14 | 41.8 | 11.3 |
| 15 | 41.9 | 11.9 |
| 16 | 38.1 | 16.3 |
| 17 | 41.0 | 13.9 |
| 18 | 46.5 | 8.9 |

Serial number : 1053
Job number : 96-092
Remarks : 3 meter calibration
Standards : LPD-118/A, TE-1000

Temperature : 72° F
Humidity : 56 %
Traceability : A01887
Date : December 08, 1995

Calibrated By

# Com-Power Corporation

(714) 587-9800

**Antenna Calibration**

| | |
|---|---|
| Antenna Type: | Loop Antenna |
| Model: | AL-130 |
| Serial Number: | 25309 |
| Calibration Date: | 2/5/98 |

| Frequency MHz | Magnetic (dB/m) | Electric dB/m |
|---|---|---|
| 0.01 | -40.5 | 11.0 |
| 0.02 | -41.6 | 9.9 |
| 0.03 | -40.0 | 11.5 |
| 0.04 | -40.3 | 11.2 |
| 0.05 | -41.6 | 9.9 |
| 0.06 | -41.1 | 10.4 |
| 0.07 | -41.3 | 10.2 |
| 0.08 | -41.6 | 9.9 |
| 0.09 | -41.7 | 9.8 |
| 0.1 | -41.8 | 9.7 |
| 0.2 | -44.0 | 7.5 |
| 0.3 | -41.6 | 9.9 |
| 0.4 | -41.7 | 9.8 |
| 0.5 | -41.7 | 9.8 |
| 0.6 | -41.5 | 10.0 |
| 0.7 | -41.5 | 10.0 |
| 0.8 | -41.6 | 9.9 |
| 0.9 | -41.6 | 9.9 |
| 1 | -41.1 | 10.4 |
| 2 | -40.7 | 10.8 |
| 3 | -40.7 | 10.8 |
| 4 | -40.9 | 10.6 |
| 5 | -40.1 | 11.4 |
| 6 | -40.0 | 11.5 |
| 7 | -40.3 | 11.2 |
| 8 | -39.8 | 11.7 |
| 9 | -38.8 | 12.7 |
| 10 | -40.8 | 10.7 |
| 12 | -41.4 | 10.1 |
| 14 | -41.4 | 10.1 |
| 15 | -40.9 | 10.6 |
| 16 | -40.8 | 10.7 |
| 18 | -41.5 | 10.0 |
| 20 | -41.5 | 10.0 |
| 25 | -41.2 | 10.3 |
| 30 | -41.4 | 10.1 |

| | |
|---|---|
| Trans. Antenna Height | 2 meter |
| Receiving Antenna Height | 2 meter |

# EXHIBIT 7

SCHEMATICS AND DUTY CYCLE INFORMATION

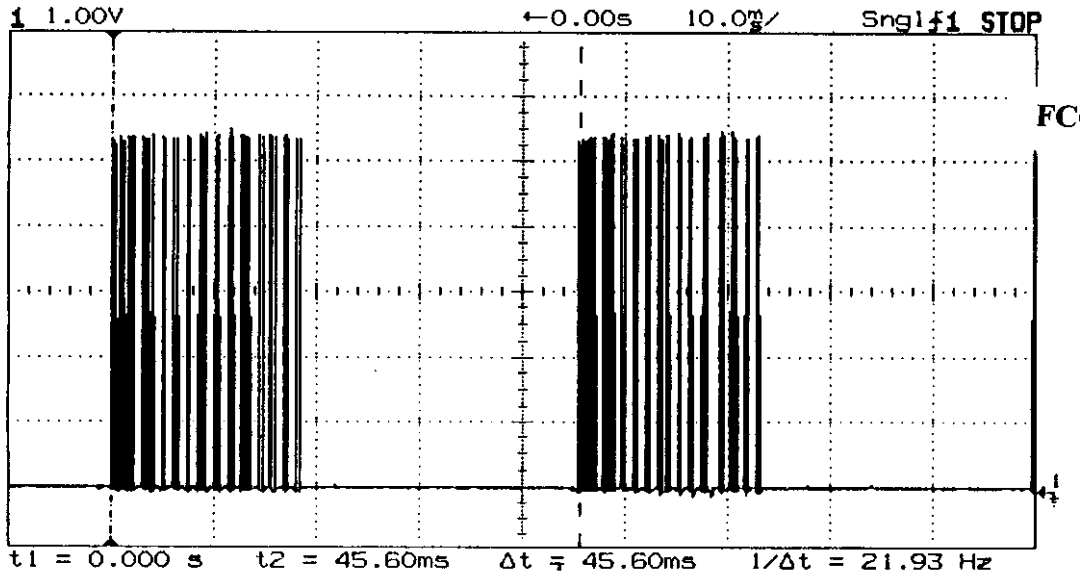



Figure 1

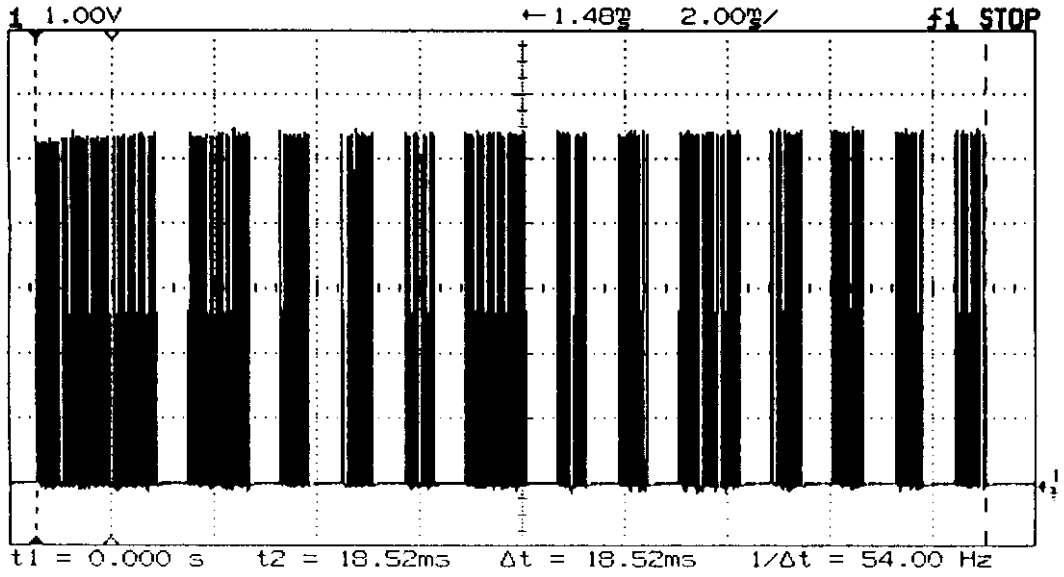



Figure 2

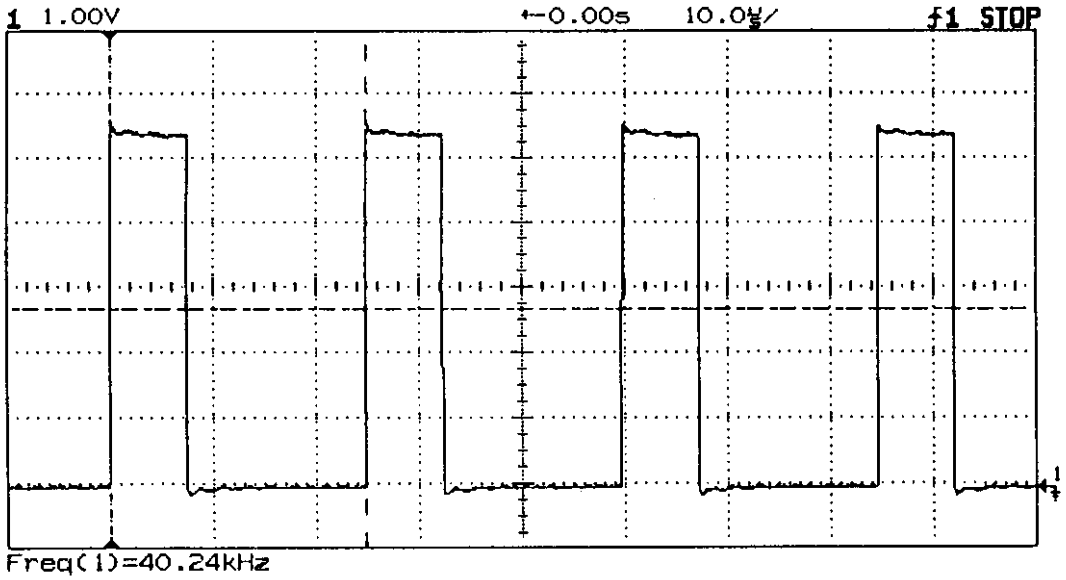



Figure 3

# FCC ID: AA01501935

## 1. Duty Cycle Factor of Baseband Signal for 15-1935 RF Remote Control

The baseband signal modulating the 430.0 Mhz RF carrier is the same digital signal that drives the infrared LED in a remote control to operate audio/video systems. This signal is tipically a 40Khz, low duty-cycle square waveform, modulated by a lower frequency code sequence specific for the device to be controlled. The duty cycle of the 40 Khz waveform must be low in order to optimize the emission efficiency of the infrared LED. A snapshot of the baseband signal for a Sony TV is showin in Figs. 1,2,and3 (attached). Fig. 1 shows the timing between two code sequences, separated by a blanking interval. Fig. 2 shows the patttern of a typical code sequence, and fig. 3 shoes the 40 Khz carrier frequency of a code sequence. The duty cycle factor of the baseband signal will be calculated as the product of the duty cycles of all three waveforms.

**Waveform of Fig. 1**

Ton (max)=22.8ms

T=45.60ms

Duty Cycle (1)=[Ton(max) / T]=(22.8ms/45.6ms)=0.5

**Waveform of fig. 2**

Ton (max)=18.52ms

T=22.8ms

Duty Cycle (2)= [Ton(max) / T]=(18.52ms/22.6ms)=0.81

**Waveform of Fig. 3**

Ton (max)=7.3us

T=24.85us

Duty Cycle (3)=[Ton(max) / T]=(7.3us/24.85us)=0.29

**Duty Cycle Factor= D.C. (1) * D.C. (2) * D.C. (3) * 100=**
=0.5 * 0.81 * 0.29 * 100= **11.745%**

**2.** The 15-1935 RF remote control has a built-in, internal antenna which is not user accessible. Therefore, the device meets the requirements of 15.203.