DNB ENGINEERING, INC.

CERTIFICATION FOR AN INTENTIONAL RADIATOR

per
Part 15 Subpart C
(CFR 47, 15.231, 15.205, 15.209)

EUT: UNIVERSAL REMOTE
Model No. URC 440

PREPARED FOR APPLICANT:
NEXT LEVEL SYSTEMS, INC.
6262 Lusk Blvd.
San Diego, CA 92121

REPORT # 86055-1

Prepared By:
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Document History

Revision Letter	Number of Pages	Page No. of Rev.	Description	Date
	65		Document Release	April 7, 1998

TRANSMITTAL SUMMARY

Unit tested: UNIVERSAL REMOTE m/n URC 440

Specifications: FCC Part 15
ANSI C63.4 (1992)
CFR 47 FCC part 15 Subpart C

Purpose of Report: This report was prepared to document the status of the UNIVERSAL REMOTE m/n URC 440 with requirements of the regulations listed above.

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

REQUIREMENTS	STATUS
FCC part 15 Subpart C	
per 15.231, 15.205 & 15.209	COMPLIANT

This report contains data on two samples of the same model, both samples are compliant to FCC requirements.

CERTIFICATION OF TEST DATA - per 2.911(d)

This report, containing emissions test data and evaluations, has been prepared by an independent electromagnetic compatibility laboratory, DNB ENGINEERING, in accordance with the applicable specifications and instructions required per the Introduction. DNB Engineering has been evaluated and approved to do these tests as proof of compliance.

The data evaluation and equipment configuration presented herein are a true and accurate representation of the measurements of the test emissions characteristics as of the dates and at the times of the test under the conditions herein specified.

Equipment Tested:	UNIVERSAL REMOTE m/n URC 440
FCC ID:	F2NURC440T
Dates of Test:	Feb. 19, 20, 23, 24, & 26, 1998

Test Performed By: Stefen J. Munford — 3 April 1998 (Date)
Stefen J. Munford
Testing & Regulatory Engineer

Report Reviewed By: Rick Linford — April 6, 1998 (Date)
Rick Linford
Facility Manager
Regulatory Engineer

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1. INTRODUCTION

1.1 Administrative Data Per 2.1033(a) and 2.911(c)

1.1.1 REQUEST FOR CERTIFICATION Per 2.1033(b)1:

Applicant:	NEXT LEVEL SYSTEMS, INC. 6262 Lusk Blvd. San Diego, CA 92121
Contact:	Kerry Galloway
Phone:	619-404-2580
Manufacturer:	Same as above
Dates of Test:	Feb. 19, 20, 23, 24 & 26, 1998
Equipment Under Test (EUT):	UNIVERSAL REMOTE m/n URC 440
FCC ID:	F2NURC440T

1.2 Related Submittals/Grants

Not applicable

1.3 Purpose of Tests

The purpose of this series of tests was to demonstrate the Radio Frequency Field Strength characteristics of the EUT. The following tests were performed:

REQUIREMENTS	*STATUS*
FCC part 15 Subpart C	
per 15.231, 15.205 & 15.209	*COMPLIANT*

2. TEST DESCRIPTION

2.1 System Configuration Table

Config-uration	Unit Name - Processor, Monitor, Printer, Cable, etc. (Indent for features of a unit)	Style/Model/ Part No.	Serial Number	Obj. of test	120 V	220 V	Comments/ FCC ID#
A	Remote #1	URC-440	N/A	■			F2NURC440T
B	Remote #2	URC-440	N/A	■			F2NURC440T

Two samples of the same model and configuration were tested to provide a statistical basis for production. They were tested in vertical, horizontal and side orientation.

■ - Specific device(s) for which this test is being conducted.

2.2 Equipment Description - per 15.231(a)(1)

A remote control unit to operate multiple electronic devices, such as a TV, VCR, Cable Box, or a Satellite Tuner / Controller.

2.3 Circuit Description - per 2.1033(b)4 & 15.231(a)(1)

The URC 440, 4 in 1 IR/UHF Remote is a universal remote control. It is intended as a remote control unit that is capable of operating in three different modes, i.e. TV, VCR, cable and Satellite receiver modes. Four dedicated keys are allocated to switch between these modes. A single LED indicator shall be visible to indicate the various modes of operation.

2.3.1 Mode of Operation

Enter button being depressed to transmit at 433.9 MHz to control satellite TV tuner. All buttons were checked to find the worst case button at the transmit frequency.

2.3.2 Modifications to EUT

No changes were made to the EUT.

2.4 Occupied Bandwidth per 15.231(c)

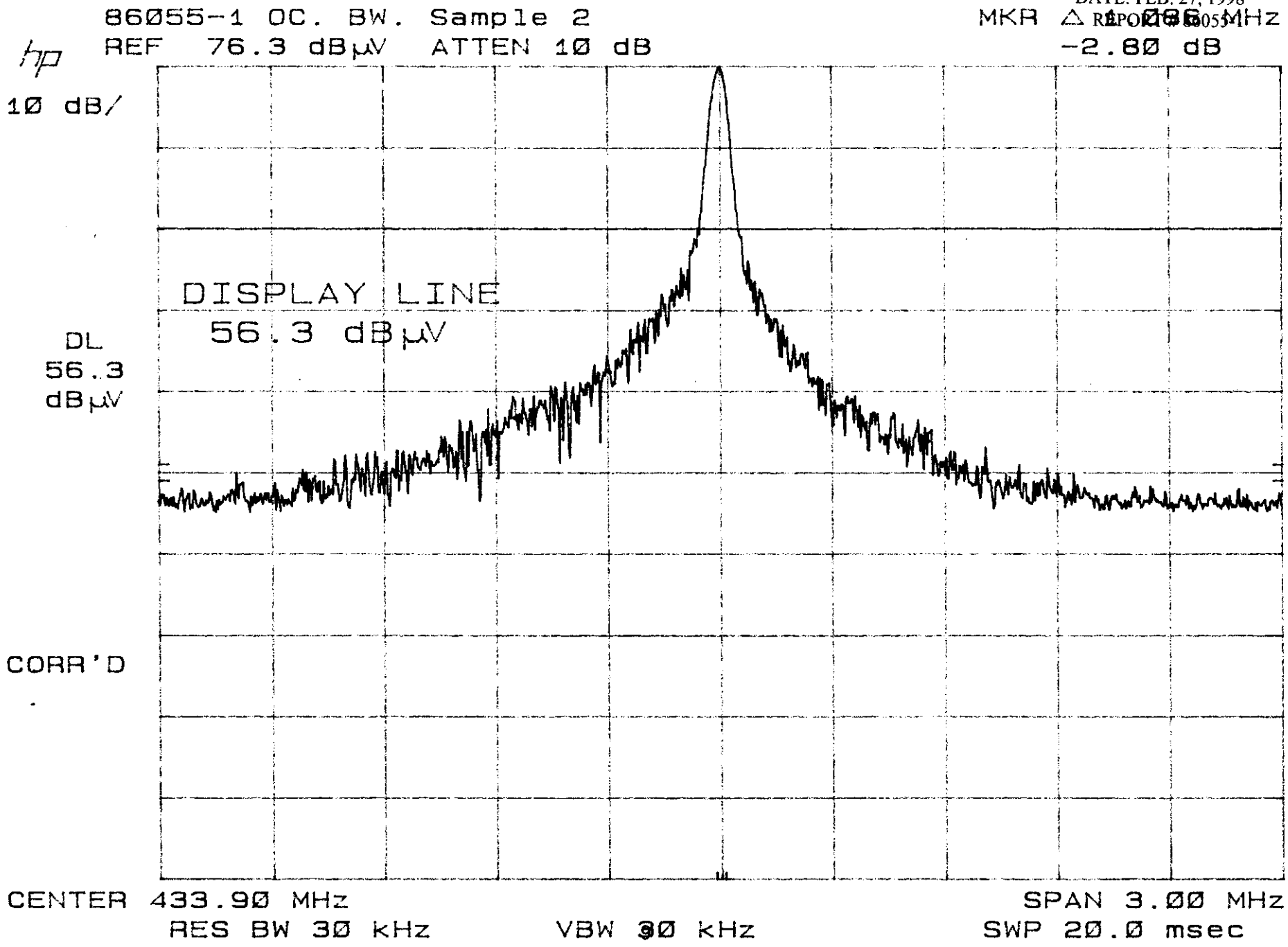
The occupied bandwidth at the transceiver's fundamental frequency output was measured using a HP8566B spectrum analyzer.

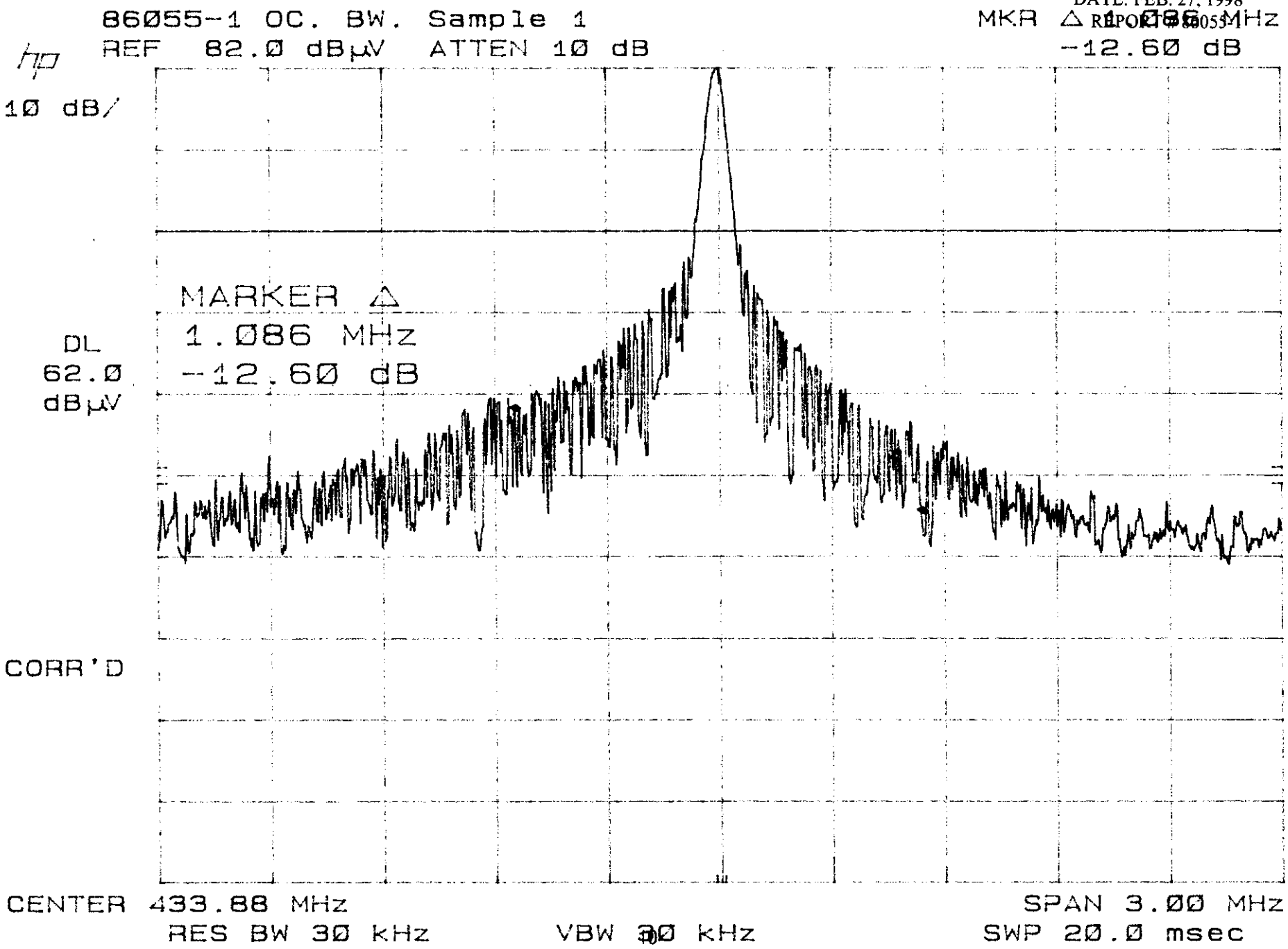
The spectrum analyzer was adjusted as follows:

Frequency: 433.9 MHz	*Resolution Bandwidth: 30 kHz*
Input Attenuation: 10.0 dB	*Video Bandwidth: 30 kHz*
Scan Width: 3 MHz, 300 kHz/div	*Reference Level: as needed*
Vertical Scale: 10 dB/div	*Detector: Peak*

2.4.1 Test Data and Results

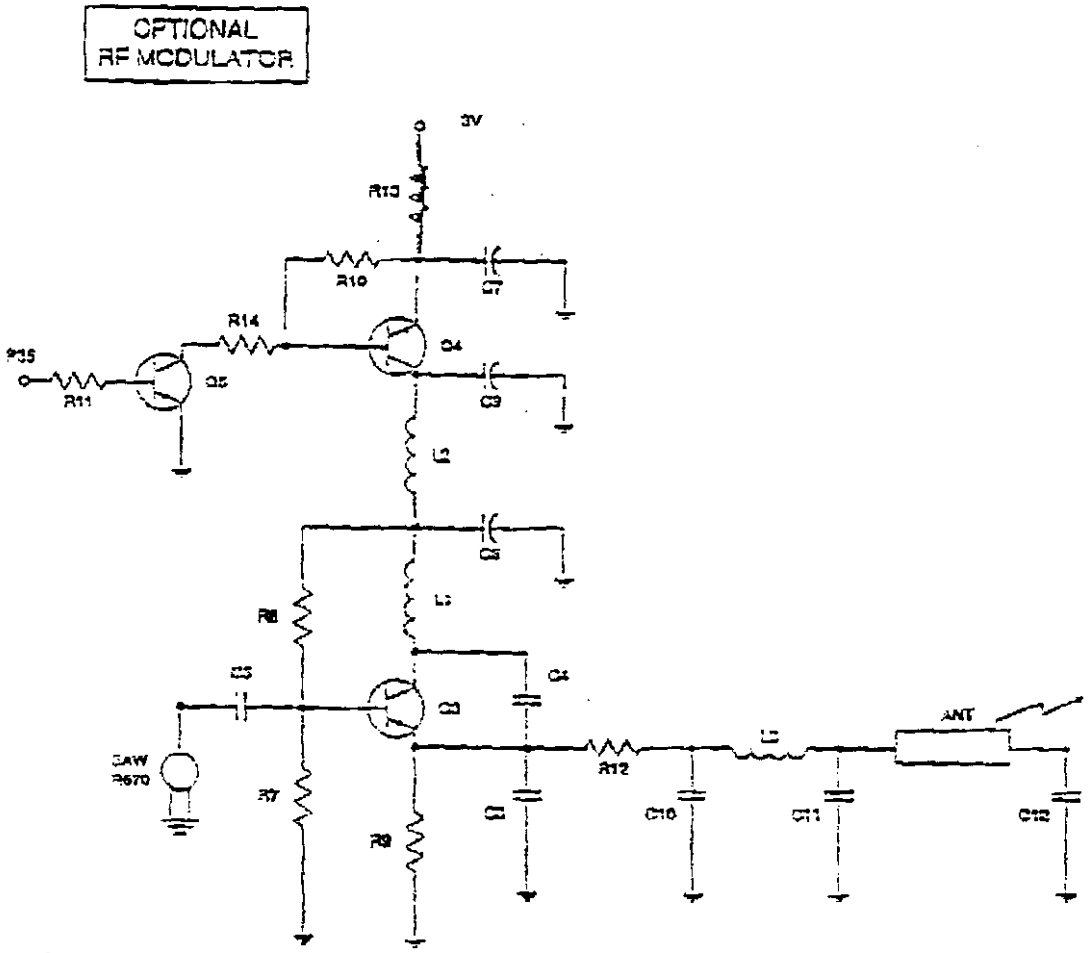
NOTE: See the following two pages.


86055-1 OC. BW. Sample 2
REF 76.3 dBµV
ATTEN 10 dB
MKR △ 1.286 MHz
-2.80 dB
10 dB/
DISPLAY LINE
56.3 dBµV
DL
56.3
dBµV
CORR'D
CENTER 433.90 MHz
RES BW 30 kHz
VBW 30 kHz
SPAN 3.00 MHz
SWP 20.0 msec

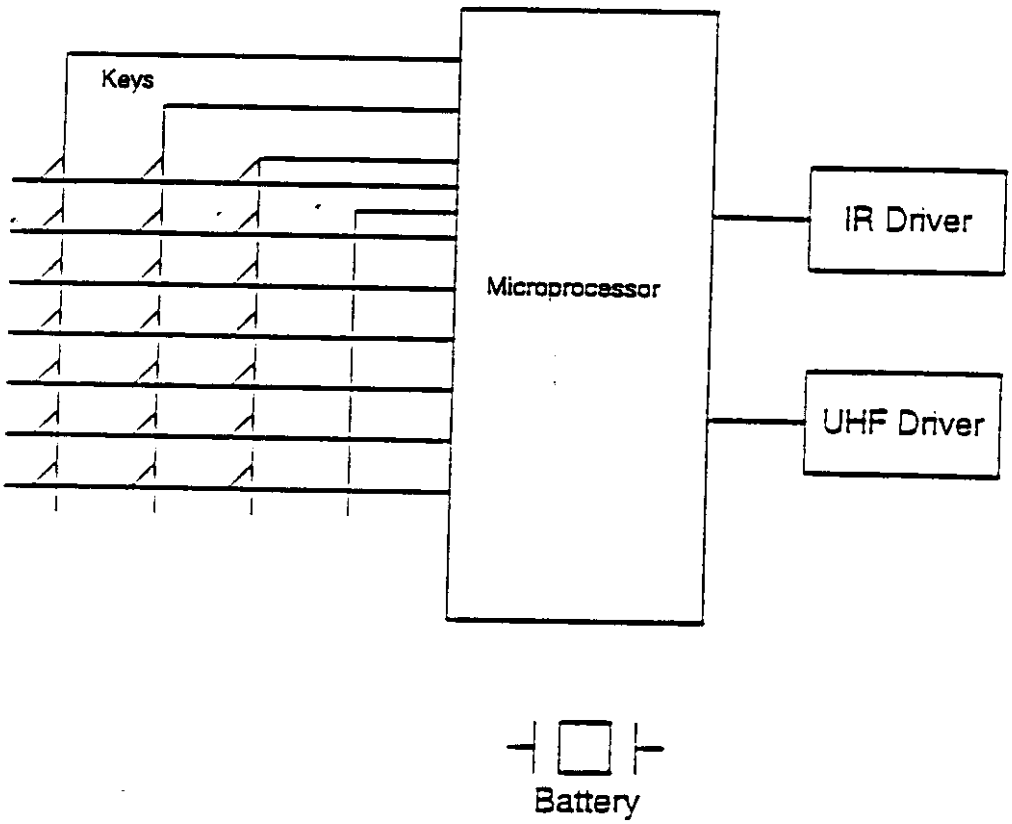

86055-1 OC. BW. Sample 1
MKR Δ 1.086 MHz
REF 82.0 dBμV ATTEN 10 dB
-12.60 dB
10 dB/
MARKER Δ
1.086 MHz
-12.60 dB
DL
62.0
dBμV
CORR'D
CENTER 433.88 MHz
SPAN 3.00 MHz
RES BW 30 kHz
VBW 30 kHz
SWP 20.0 msec

2.5 Internal Block Diagram and Schematics

Block Diagram - UNIVERSAL REMOTE m/n URC-440



Block Diagram of EUT



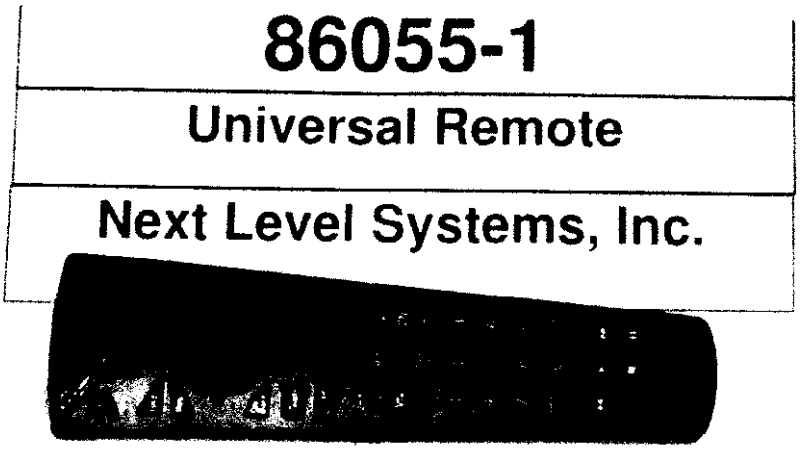
Typical Block Diagram Universal Remote Control

2.6 Photograph of EUT - per 2.1033(b)(7)

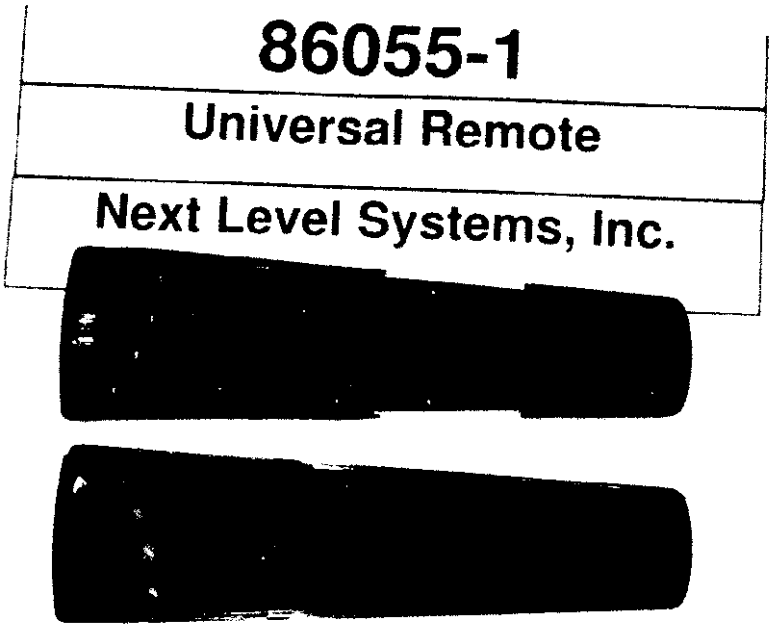
UNIVERSAL REMOTE m/n URC-440

Photo # 1. Photo of the EUT
Photo # 2. Internal Top View
Photo # 3. Internal Bottom View
Photo # 4. Bottom of Case
Photo # 5. Internal Top Pieces
Photo # 6. Top View PCB
Photo # 7. Bottom View PCB

FCC ID: F2NURC440T
URC 440
Page # 12a Photo # 1
Photo of EUT



FCC ID: F2NURC440T
URC 440
Page # 12b Photo # 2
Internal Top View



FCC ID: F2NURC440T
URC 440
Page # 12c Photo # 3
Internal Bottom View

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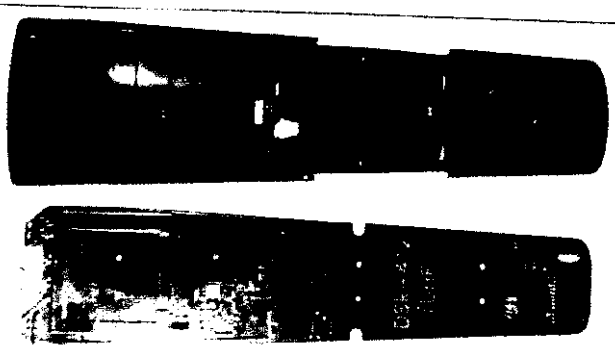
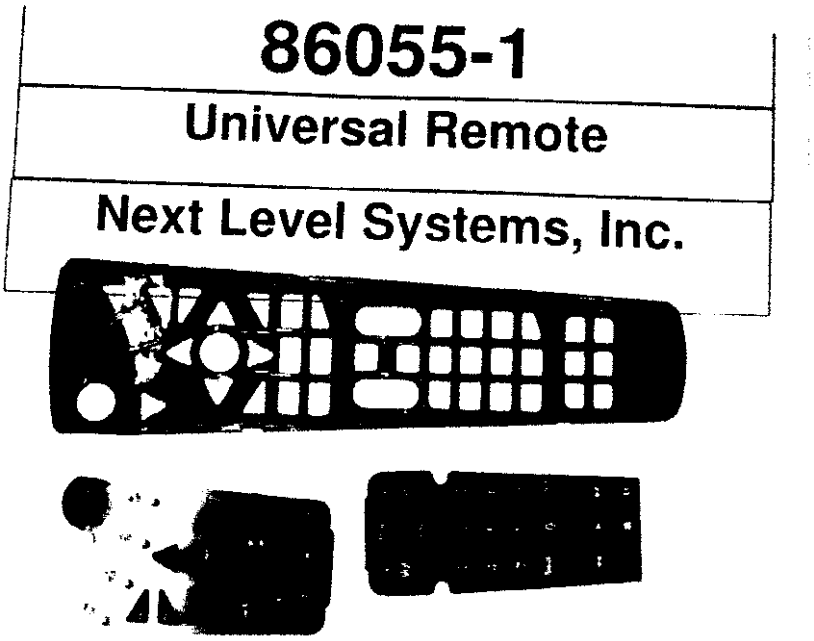
Universal Remote

Next Level Systems, Inc.



FCC ID: F2NURC440T
URC 440
Page # 12d Photo # 4
Bottom of Case

FCC ID: F2NURC440T
URC 440
Page # 12e Photo # 5
Internal Top Pieces



FCC ID: F2NURC440T
URC 440
Page # 12f Photo # 6
Top View PCB

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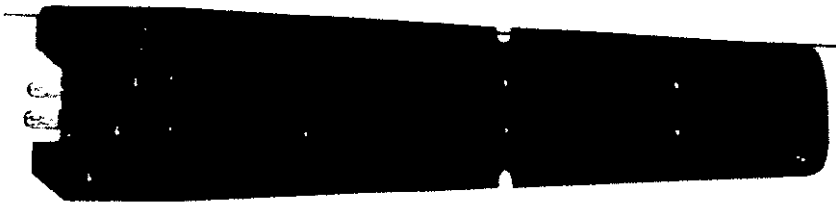
Universal Remote

Next Level Systems, Inc.

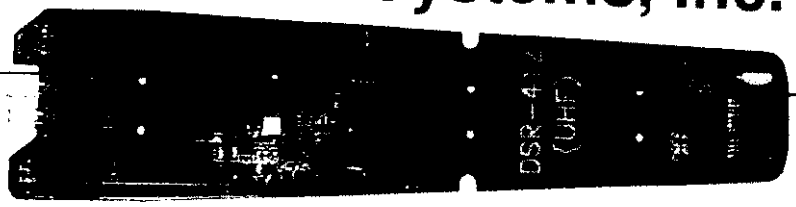


FCC ID: F2NURC440T
URC 440
Page # 12g Photo # 7
Bottom View PCB

86055-1

Universal Remote

Next Level Systems, Inc.



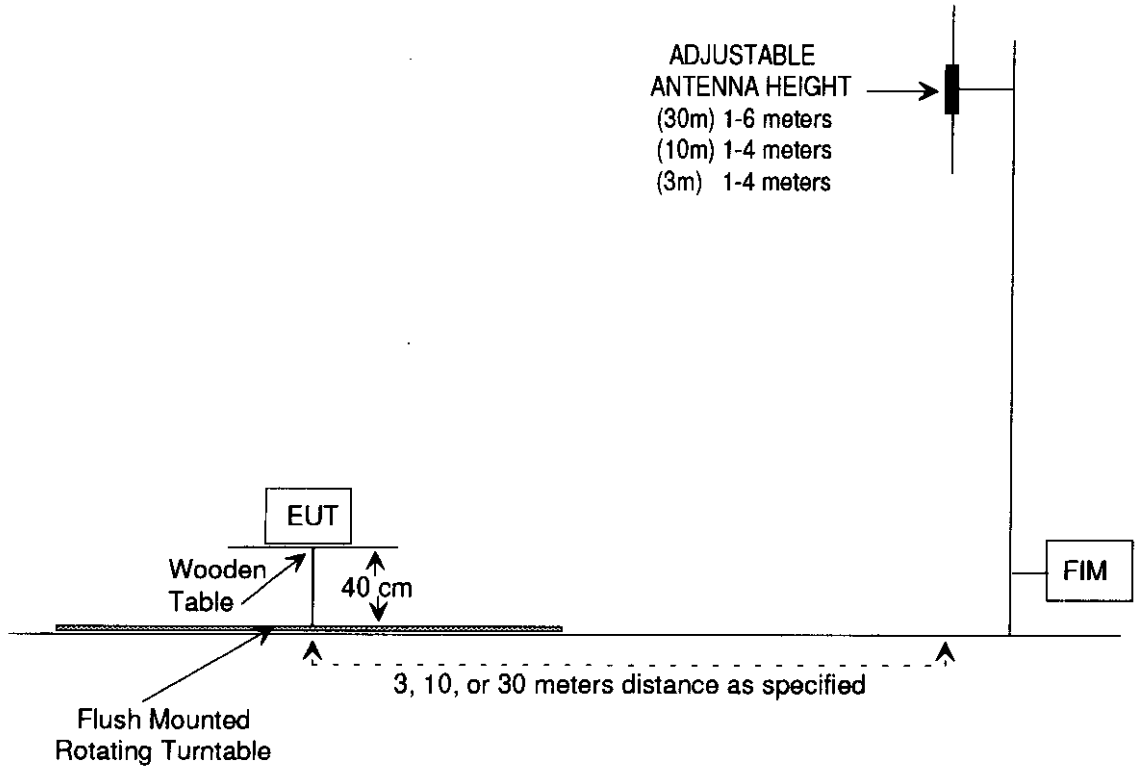
3. EMISSIONS FCC PART 15

per FCC part 15, class B

3.1 Radiated Emissions Test Setup and Procedure - Per 2.1033(b)(6), 2.947(a), 15.231(b)(1-3), 15.205(a-c), 15.209(a-d), 15.31(d-g), 15.33(a)(4), 15.35(a-c)

The EUT was placed on a wooden table 1 meter wide and 1.5 meters long which rests on a flush mounted, steel-top turntable on the open area test site as shown in Section 3.1.1.1. The top of the table is 80 cm above the ground plane. The turn-table 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 4.5 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 2.3.1 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 plotted with the addition of antenna and cable correction factors. The limit is plotted 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. Ambients are 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.

Radiated Test Setup and Procedure - cont'd

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 8568B 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

Rohde and Schwarz 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

3.2 Measurements above 1 GHz - Per 15.35(b) & 15.35 (c)

3.2.1 *CFR 47 PART 15.35(b)*

Radiated testing in the range of 1000 MHz to 5000 MHz was investigated with the spectrum (peak detector function) under the FCC regulation section 15.35 (b). The test performed at an antenna to EUT distance of three meters.

3.2.2 CFR 47 PART 15.35(c)

A peak detector was used to measure all signals then a correction factor for an average measurement was applied. The peak to average correction factor was for pulse modulated signals per 15.35(c). No signals were in restricted bands below 1 GHz.

The Duty cycle correction factor was calculated by measuring 10 different pulse trains, each was measured per 15.35(c).

It was found that there were fourteen TX pulses in each pulse train. Each pulse train had one pulse on for 4.8 to 5.0 mS and thirteen pulses on for 0.8 to 1.0 mS. The on time was taken for the worst case ware the single wide pulse was on for 5.0 mS and the remaining were on for 1.0 mS for a total on time of 18 mS during a 100 mS time span.

The correction factor is calculated by the following equation:

$$20\log(18/100) = -14.89dB$$

3.2.2.1 Duty cycle on/off times per 15.35(c)

NOTE: See the following ten pages for test data.