



# Nemko

**Test Report:** 2W06481


**Applicant:** DESA International  
2901 Industrial Drive  
Bowling Green, KY  
42102

**Equipment Under Test:  
(EUT)** Wireless Lighted Chime Control Model 6440TX/6441TX  
315MHz Transmitter

**FCC ID:** BJ4-64WDB40TX

**In Accordance With:** **FCC Part 15, Subpart C, 15.231**

**Tested By:** Nemko Canada Inc.  
303 River Road, R.R. 5  
Ottawa, Ontario K1V 1H2

**Authorized By:**   
Glen Westwell, Wireless Technologist

**Date:** 23 September 2002

**Total Number of Pages:** 21

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*EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control*

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## Section 1. Summary of Test Results

### General

**All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. NONE



TESTED BY: \_\_\_\_\_  
Kevin Carr, EMC Specialist

DATE: 20 September 2002

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This report applies only to the items tested.

*EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control*

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**Summary Of Test Data**

<b>Name of Test</b>	<b>Para. Number</b>	<b>Results</b>
Transmission Requirements	15.231(a)	Complied
Radiated Emissions	15.231(b)	Complied
Occupied Bandwidth	15.231(c)	Complied
Frequency Tolerance	15.231(d)	N/A
Periodic Alternate Field Strength Requirements	15.231(e)	N/A
Power line Conducted Emissions	15.207	N/A

**Notes:**

This certification is for the 6440TX and the 6441TX 315MHz transmitter. The RF circuitry for both models is identical. Compliance was demonstrated using one sample of the 6440TX model.

**Indoor**                      Temperature: 22°C  
   Humidity: 40%

**Outdoor**                    Temperature: 17°C  
   Humidity: 65%

*EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control*

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## Section 2. Equipment Under Test

### General Equipment Information

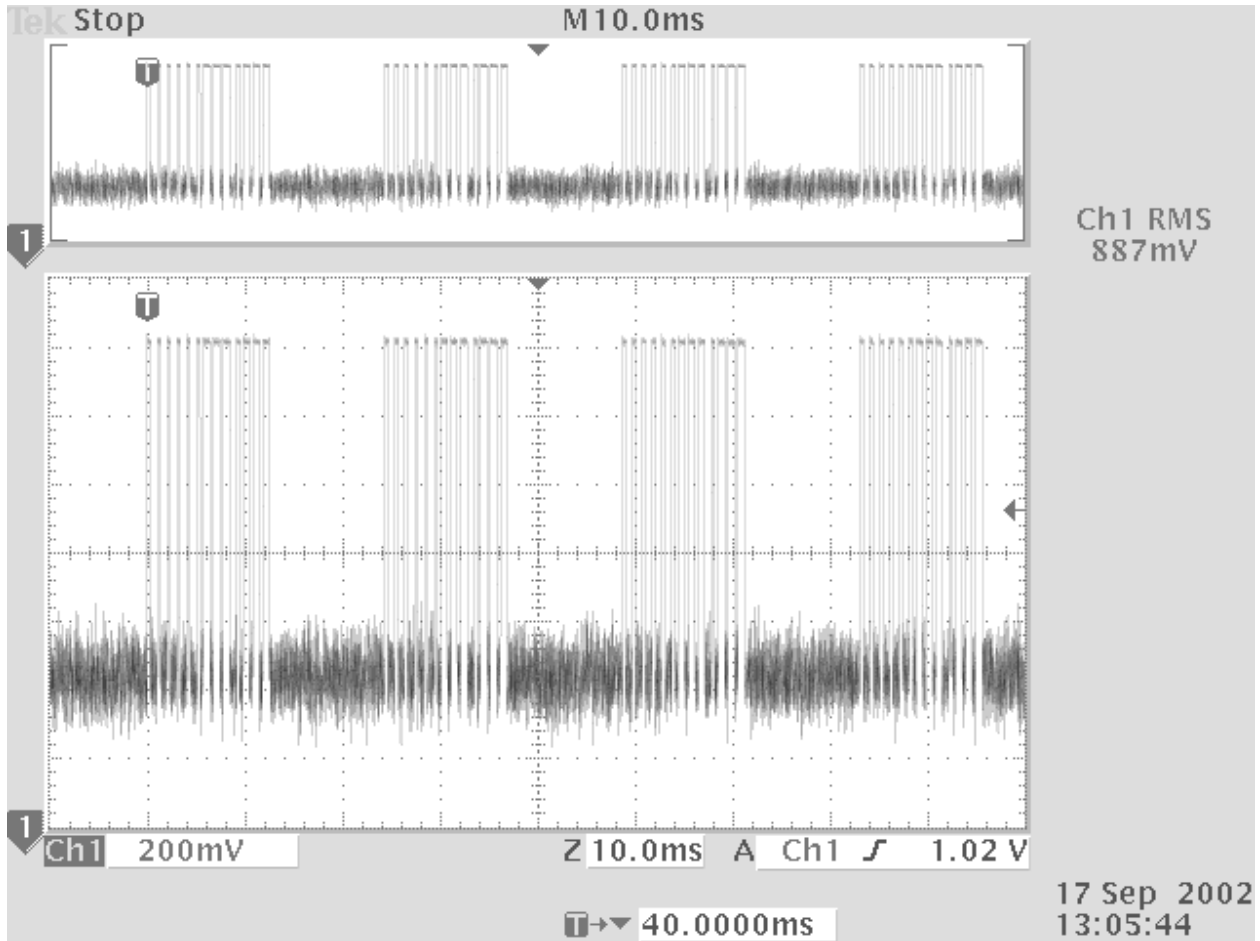
<b>Manufacturer:</b>	Desa International
<b>Model No.:</b>	6440TX
<b>Serial No.:</b>	None
<b>Date Received In Laboratory:</b>	17 Sept. 2002
<b>Nemko Identification No.:</b>	1
<b>Frequency Range (or fixed frequency):</b>	315MHz -Fixed
<b>RF Power in Watts:</b>	0.00000105
<b>Field Strength (distance):</b>	68.0dBuV@3 meters
<b>Occupied Bandwidth (99% BW):</b>	108.3kHz
<b>Type of Modulation:</b>	PCM
<b>Emission Designator:</b>	108K3L1D
<b>Transmitter Spurious (worst case):</b>	50.8dBuV@630MHz
<b>Primary Input Power:</b>	Two, CR-2032, Lithium Batteries

### Duty Cycle Calculation:

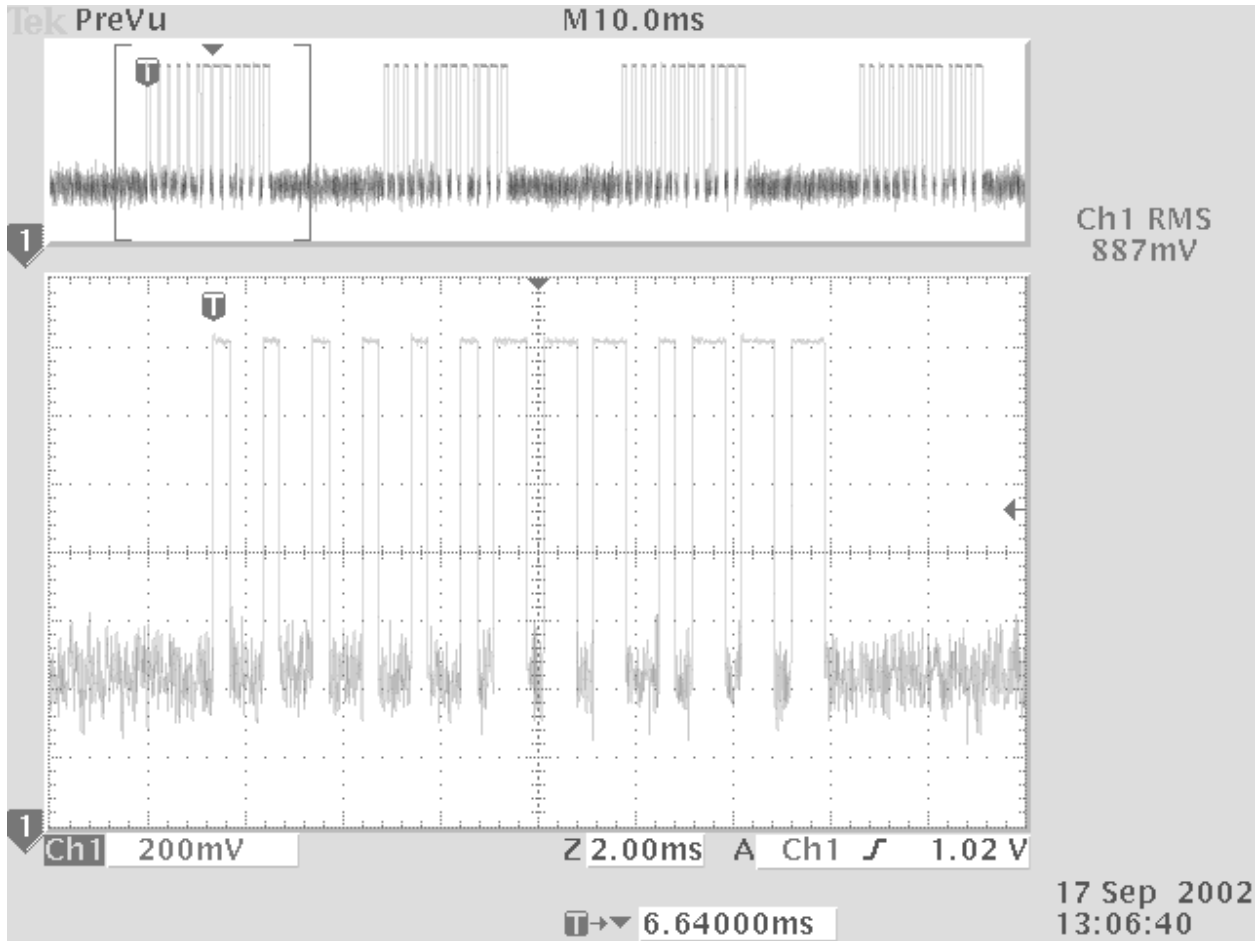
$$20\text{Log}\{((7*0.34\text{ms}+6*0.67\text{ms})*4)/100\text{ms}\} = -11.8\text{dB}$$

EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

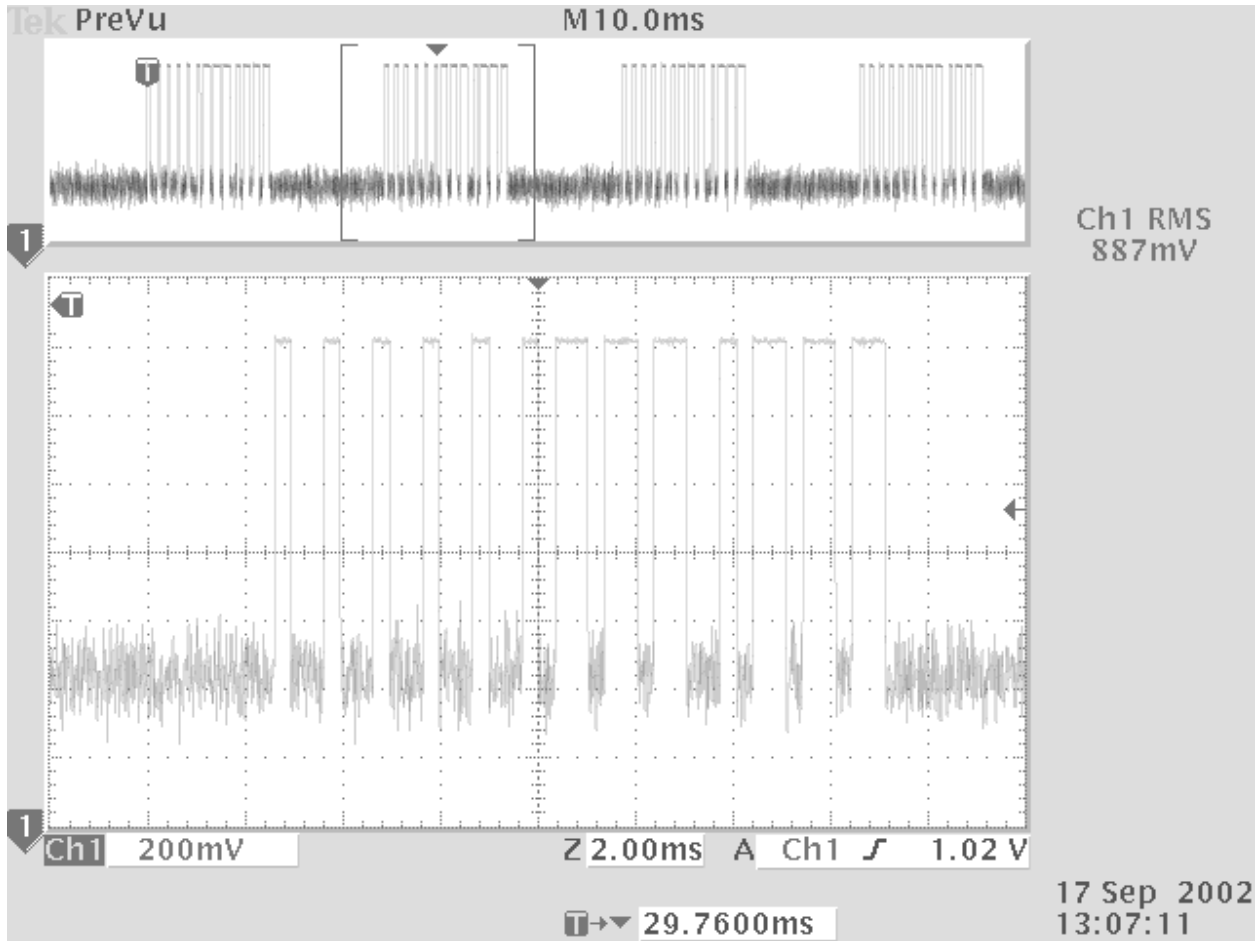
Duty Cycle Plots



EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

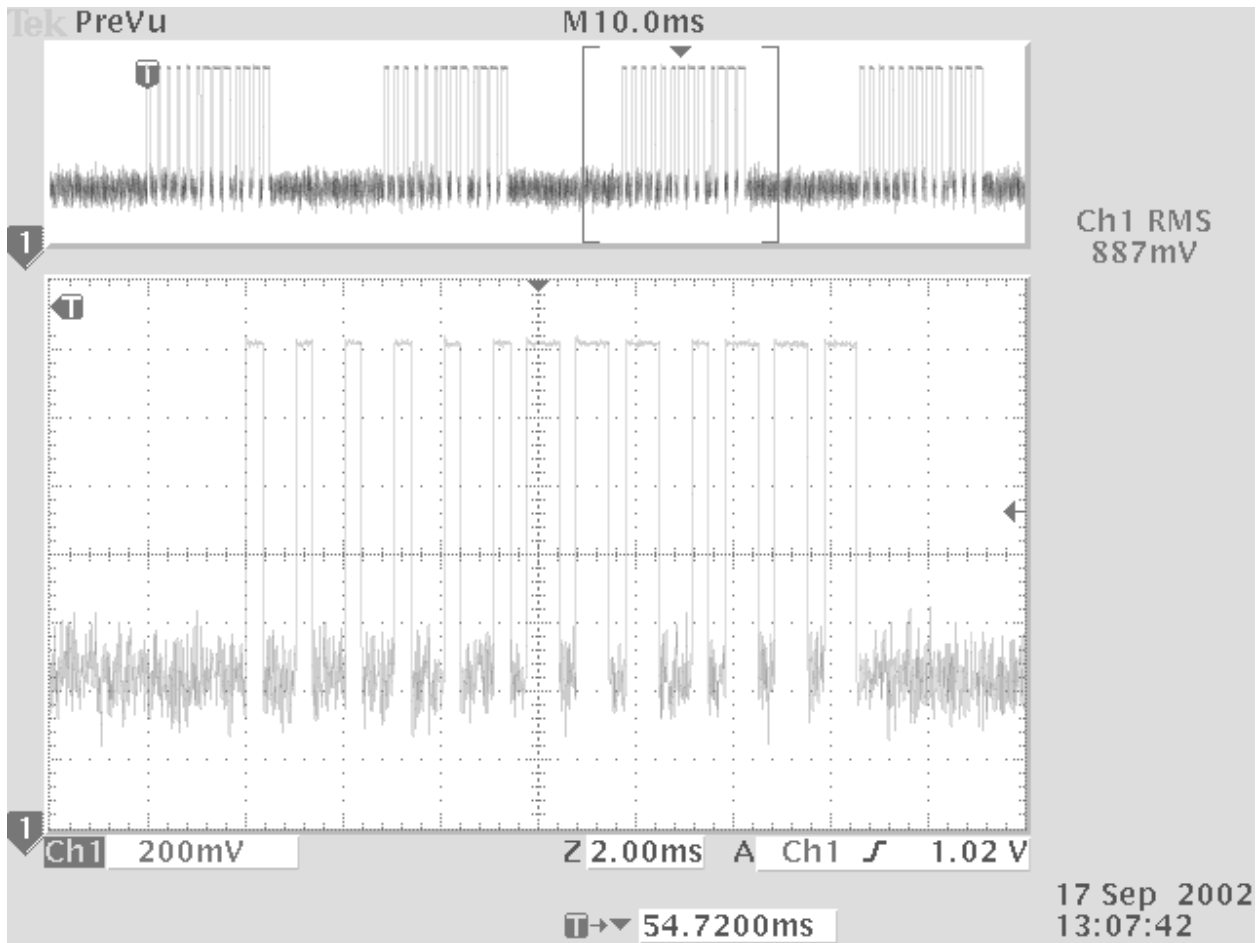


EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

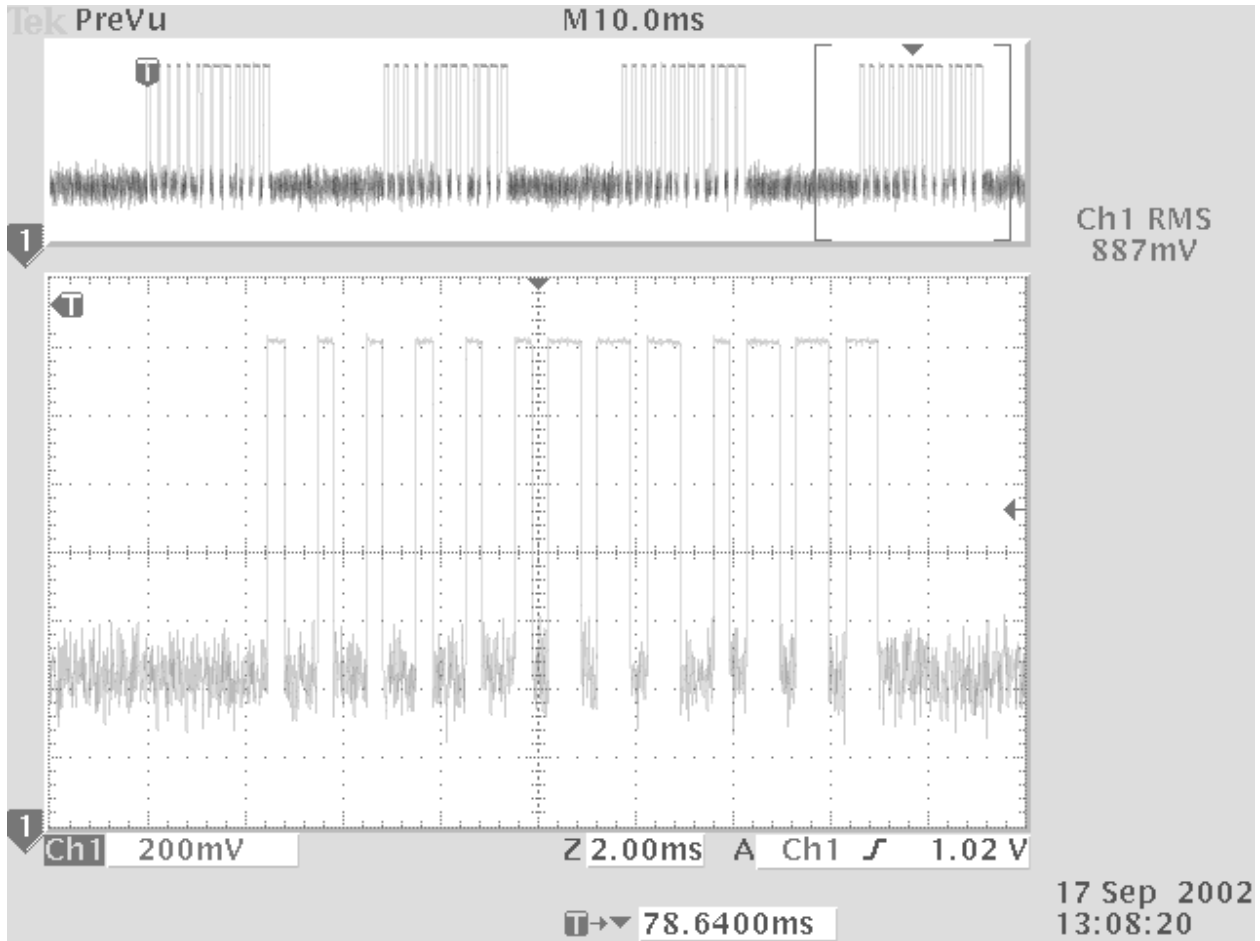




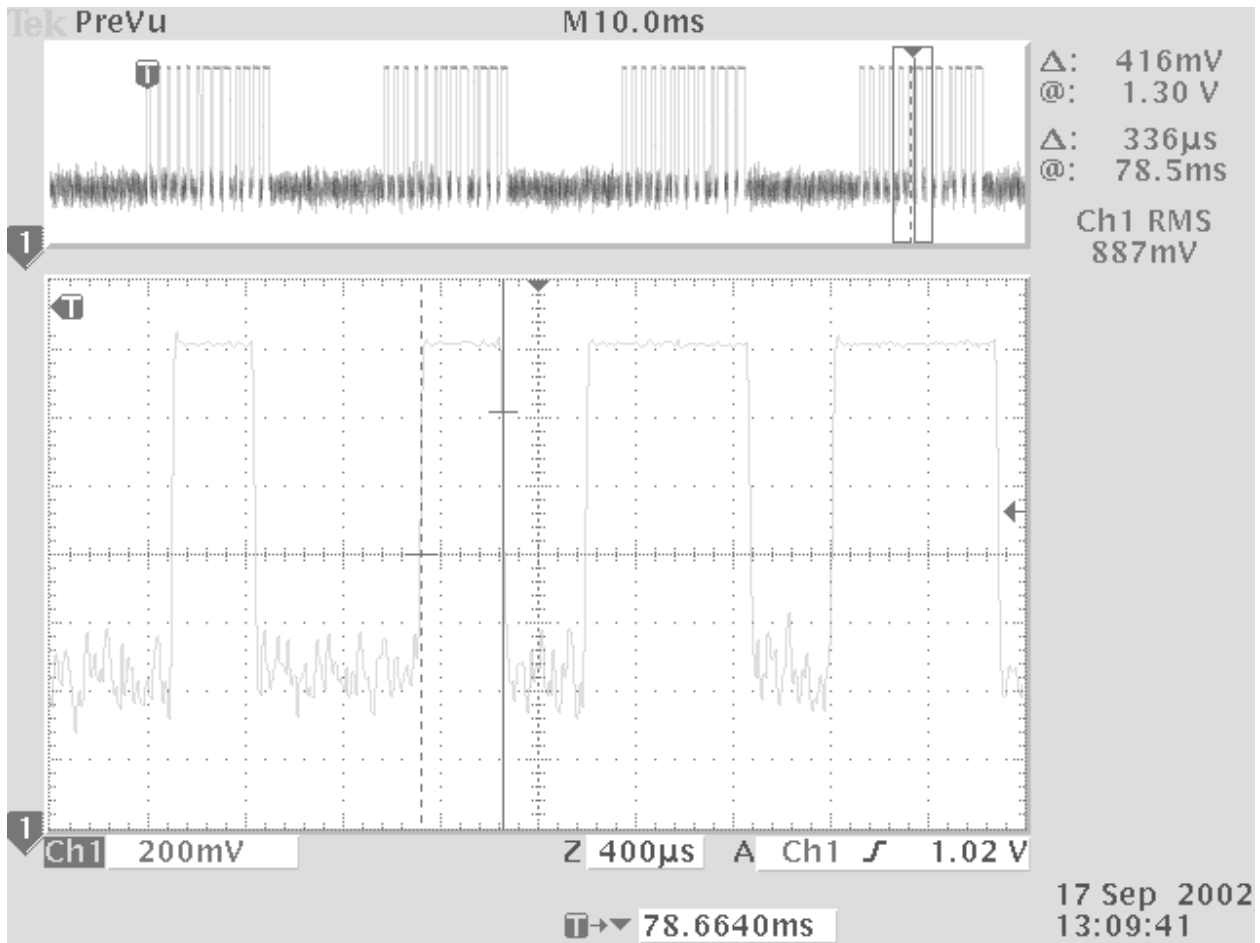
EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control



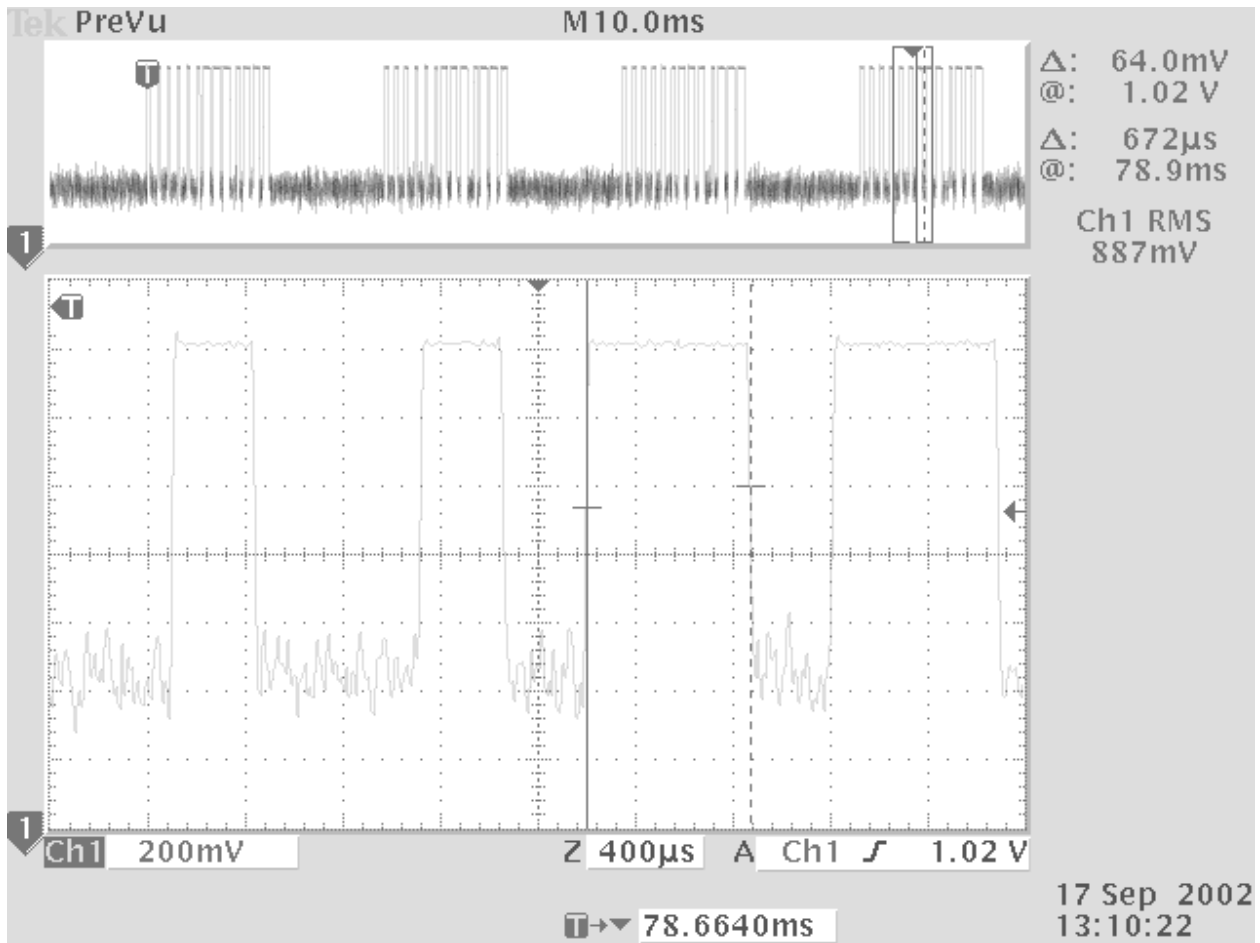
EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control



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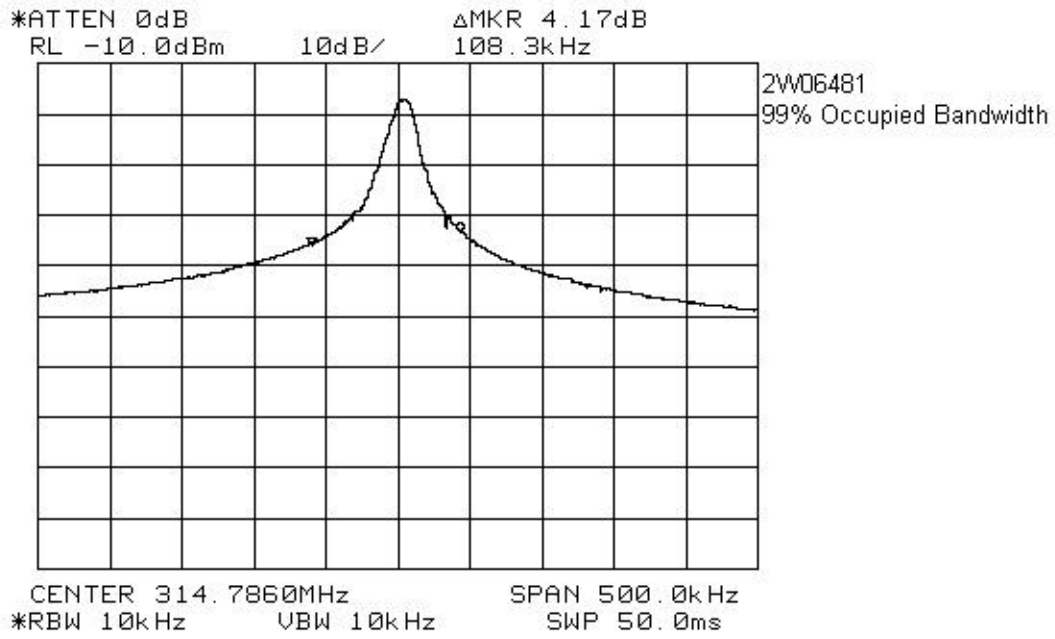
EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control



EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

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**99% Occupied Bandwidth**



### Section 3. Transmission Requirements

Para. No.: 15.231(a)

Test Performed By: Kevin Carr	Date of Test: 17 Sept. 2002
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**Minimum Standard:** 15.231(a) Continuous transmissions such as voice, video or data transmissions are not permitted.

15.231(a)(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds after being released.

15.231(a)(2) A transmitter activated automatically shall cease transmission within 5 seconds of activation.

15.231(a)(3) Periodic transmissions at regular pre-determined intervals are not permitted. However polling or supervisory transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

15.231(a)(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm.

**Test Results:** Complied

**Test Data:** Compliance was determined by verification of technical specifications and a functional test on the equipment.

EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

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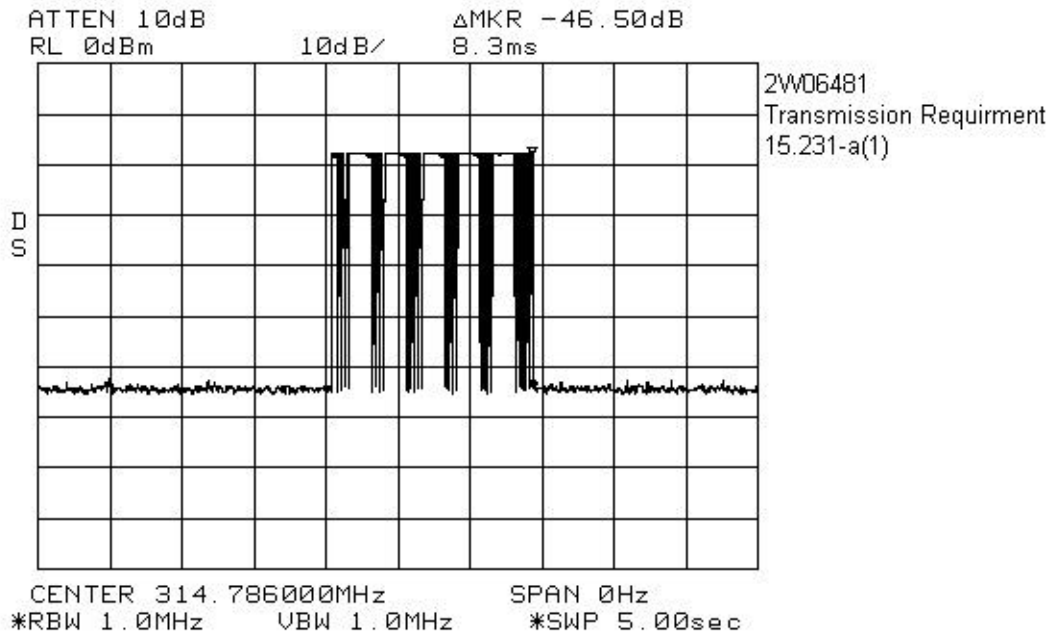
**Rationale for Compliance with Transmission Requirements**

15.231(a)(1) : Complied. The transmitter is deactivated within 5 seconds of release. See plot below.

15.231(a)(2) : N/A, This is a manually operated transmitter.

15.231(a)(3) : Complied. There are no regular periodic transmissions.

15.231(a)(4) : N/A



EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

**Section 4. Radiated Emissions**

Para. No.: 15.231(b)

<b>Test Performed By: Kevin Carr</b>	<b>Date of Test: 18 Sept. 2002</b>
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**Minimum Standard:**

Fundamental Frequency (MHz)	Field Strength of Fundamental (µV/m @ 3m)	Field Strength of Spurious Emissions (µV/m @ 3m)
40.66 - 40.70	2,250	225
70-130	1, 250	125
130-174	1,250 to 3,750*	125 to 375
174-260 (note 1)	3,750	375
260-470 (note 1)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250

Restricted Band Limits		
Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dBµV/m @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

**Test Results:** Complied

The EUT was searched on 3 orthogonal axis for worst case emissions.

Spurious and harmonic emissions were searched to the 10<sup>th</sup> harmonic.

**Test Data:** As per attached tabulated data.



EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

**Test Data - Radiated Emissions-Average**

Test Distance (meters) : 3		Range: A		Receiver: HP8465E			RBW(kHz): 120, 1000		Detector: Peak	
No.	Freq. (MHz)	Ant. *	Pol (V/H)	RCVD Signal (dBµV)	Ant. Factor (dB)**	Amp. Gain (dB)***	Duty Cycle Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	315.1	L/P1	V	61.7	17.6		-11.8	67.5	75.6	8.1
2	315.05	L/P1	H	62.2	17.6		-11.8	68	75.6	7.6
3	630.11	L/P1	V	38.9	23.7		-11.8	50.8	55.6	4.8
4	630.1	L/P1	H	29	23.7		-11.8	40.9	55.6	14.7
5	945.14	L/P1	V	31.7	28.9		-11.8	48.8	55.6	6.8
6	945.13	L/P1	H	26.2	28.9		-11.8	43.3	55.6	12.3
7	1260	Hrn2	V	81	28.5	48.2	-11.8	49.5	54	6.1
8	1260	Hrn2	H	74.5	28.5	48.2	-11.8	43	54	12.6
9	1575	Hrn2	V	61.9	30.1	47.8	-11.8	32.4	54	23.2
10	1575	Hrn2	H	57	30.1	47.8	-11.8	27.5	54	28.1
11	1890	Hrn2	V	57.6	32.6	48.2	-11.8	30.2	55.6	25.4
12	1890	Hrn2	H	53.4	32.6	48.2	-11.8	26	55.6	29.6
13	2205.3	Hrn2	V	68.3	34	58.9	-11.8	31.6	54	24
14	2205	Hrn2	H	66.7	34	58.9	-11.8	30	54	25.6
15	2520	Hrn2	V	62.9	35	60.2	-11.8	25.9	55.6	29.7
16	2520	Hrn2	H	62.8	35	60.2	-11.8	25.8	55.6	29.8
17	2835	Hrn2	V	63	36.2	60.1	-11.8	27.3	54	28.3
18	2835	Hrn2	H	61.3	36.2	60.1	-11.8	25.6	54	30
19	3150	Hrn2	V	61.3	37.2	59.8	-11.8	26.9	55.6	28.7
20	3150	Hrn2	H	60.3	37.2	59.8	-11.8	25.9	55.6	29.7

**Notes:**  
 B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole  
 \* Re-measured using dipole antenna.  
 \*\* Includes cable loss when amplifier is not used.  
 \*\*\* Includes cable loss.  
 ( ) Denotes failing emission level.  
 N.D. = Not Detected

EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

**Test Data - Radiated Emissions-Peak**

Test Distance (meters) : 3		Range: A		Receiver: HP8465E			RBW(kHz): 120, 1000		Detector: Peak	
No.	Freq. (MHz)	Ant. *	Pol (V/H)	RCVD Signal (dBµV)	Ant. Factor (dB)**	Amp. Gain (dB)***	Duty Cycle Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	630.11	L/P1	V	38.9	23.7			62.6	74	11.4
2	630.1	L/P1	H	29	23.7			52.7	74	21.3
3	945.14	L/P1	V	31.7	28.9			60.6	74	13.4
4	945.13	L/P1	H	26.2	28.9			55.1	74	18.9
5	1260	Hrn2	V	81	28.5	48.2		61.3	74	12.7
6	1260	Hrn2	H	74.5	28.5	48.2		54.8	74	19.2
7	1575	Hrn2	V	61.9	30.1	47.8		44.2	74	29.8
8	1575	Hrn2	H	57	30.1	47.8		39.3	74	34.7
9	1890	Hrn2	V	57.6	32.6	48.2		42	74	32
10	1890	Hrn2	H	53.4	32.6	48.2		37.8	74	36.2
11	2205.3	Hrn2	V	68.3	34	58.9		43.4	74	30.6
12	2205	Hrn2	H	66.7	34	58.9		41.8	74	32.2
13	2520	Hrn2	V	62.9	35	60.2		37.7	74	36.3
14	2520	Hrn2	H	62.8	35	60.2		37.6	74	36.4
15	2835	Hrn2	V	63	36.2	60.1		39.1	74	34.9
16	2835	Hrn2	H	61.3	36.2	60.1		37.4	74	36.6
17	3150	Hrn2	V	61.3	37.2	59.8		38.7	74	35.3
18	3150	Hrn2	H	60.3	37.2	59.8		37.7	74	36.3

**Notes:**

B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole

\* Re-measured using dipole antenna.

\*\* Includes cable loss when amplifier is not used.

\*\*\* Includes cable loss.

( ) Denotes failing emission level.

N.D. = Not Detected

EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control

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### Section 5. Occupied Bandwidth

Para. No.: 15.231(c)

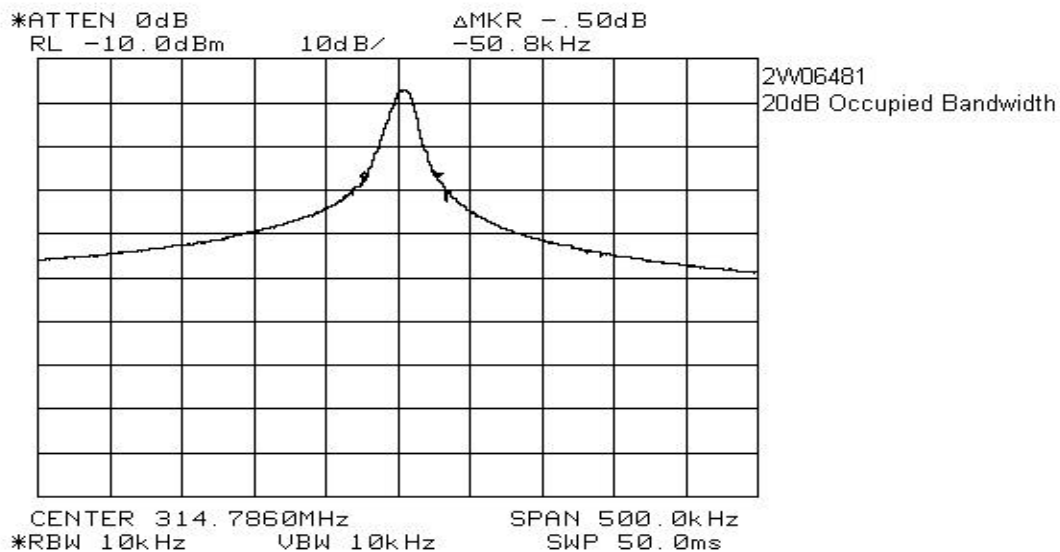
Test Performed By: Kevin Carr	Date of Test: 17 Sept. 2002
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**Minimum Standard:** 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

**Test Results:** Complied.

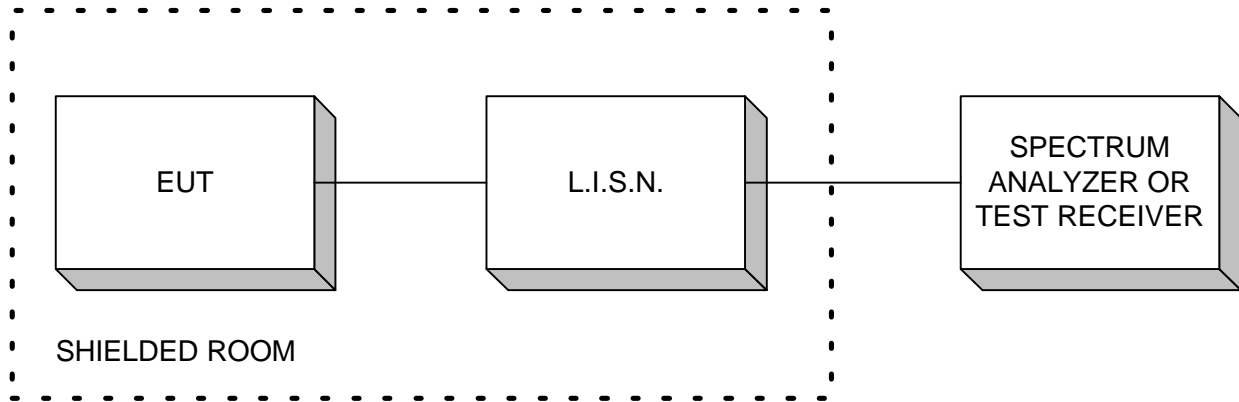
**Test Data:** See attached graph.

#### 20 dB Plot

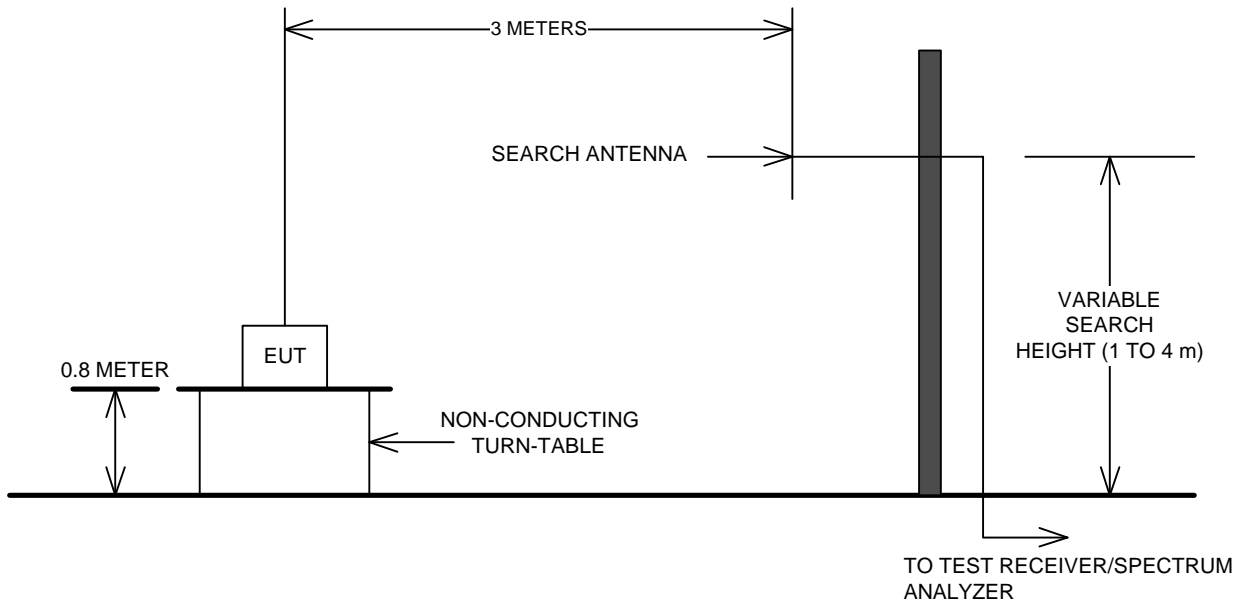


### Section 6. Block Diagrams

#### Conducted Emissions



#### Outdoor Test Site For Radiated Emissions



The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.

*EQUIPMENT: 6440/6441TX Wireless Lighted Chime Control*

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**Section 7. Test Equipment List**

**Equipment List - Radiated Emissions**

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	July. 15/02	July. 15/03
1 Year	Spectrum Analyzer	Hewlett-Packard	8564E	FA001367	Mar. 06/02	Mar. 06/03
1 Year	Horn Antenna #2	EMCO	3115	FA000825	Dec. 01/01	Dec. 01/02
1 Year	Log Periodic Antenna #2	EMCO	3148	FA001355	May. 10/02	May. 10/03
1 Year	1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June. 04/02	June. 04/03
1 Year	2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	June. 04/02	June. 04/03