

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com



Test Report

Product Name: REMOTE CONTROL TRANSMITTER

FCC ID: M45054064

Applicant:

**ESTES-COX CORP.
1295 H STREET
P.O. BOX 227
PENROSE COLORADO 81240
USA**

Date Receipt: 11/7/2005

Date Tested: 11/7/2005

APPLICANT: ESTES-COX CORP.

FCC ID: M45054064

REPORT #: E\ESTES-COX_\2146UT55\2146UT55TestReport.doc

COVER SHEET

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EXHIBITS INCLUDING:

BLOCK DIAGRAM
SCHEMATIC
PARTS LIST
USERS MANUAL
LABEL SAMPLE
LABEL LOCATION
EXTERNAL PHOTOGRAPHS
INTERNAL PHOTOGRAPHS
ALIGNMENT PROCEDURE
OPERATIONAL DESCRIPTION
TEST SET UP PHOTOGRAPH

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GENERAL INFORMATION

- 2.1033(c)(1)(2) ESTES-COX CORP. will sell the FCC ID:
M45054064 Radio Control transmitter in
quantity, for use PART 95 SUBPART C.
- ESTES-COX CORP.
1295 H STREET
P.O. BOX 227
PENROSE COLORADO 81240
- 2.1033(c)(3) Instruction manual is included in the exhibits.
- 2.1033 (4) Type of Emission: 8K0F1D
95.631 (b)(5)
- Bn = 2M + 2DK
M = 4,800 Bits per second
D = 1600 Hz (Peak Deviation)
K = 1
Bn = 2(4.8/2) + 2(1600)(1) = 4.8K + 3.2K = 8.0k
- ALLOWED AUTHORIZED BANDWIDTH = 8.00 kHz.
- 95.631 (b) Authorized Bandwidth 8 kHz for RC Transmitter
- 2.1033(c)(6) Frequency Range: 72.0 - 73.00 MHz
- 95.623 (a)(7) Power Range and Controls: There are NO user
Power controls.
- (8) Function of each electron tube or semiconductor
device or other active circuit device are
included in the exhibits
- (9) Maximum Output Power Rating: 0.164 W ERP.
- (10) DC Voltages and Current into Final Amplifier:
FINAL AMPLIFIER ONLY
- Vce = 12.0 VDC
Ice = 0.039 A.
- Pin = 0.5 W
- 2.1033(c)(11) Tune-up procedure. The tune-up procedure is
included in the exhibits.

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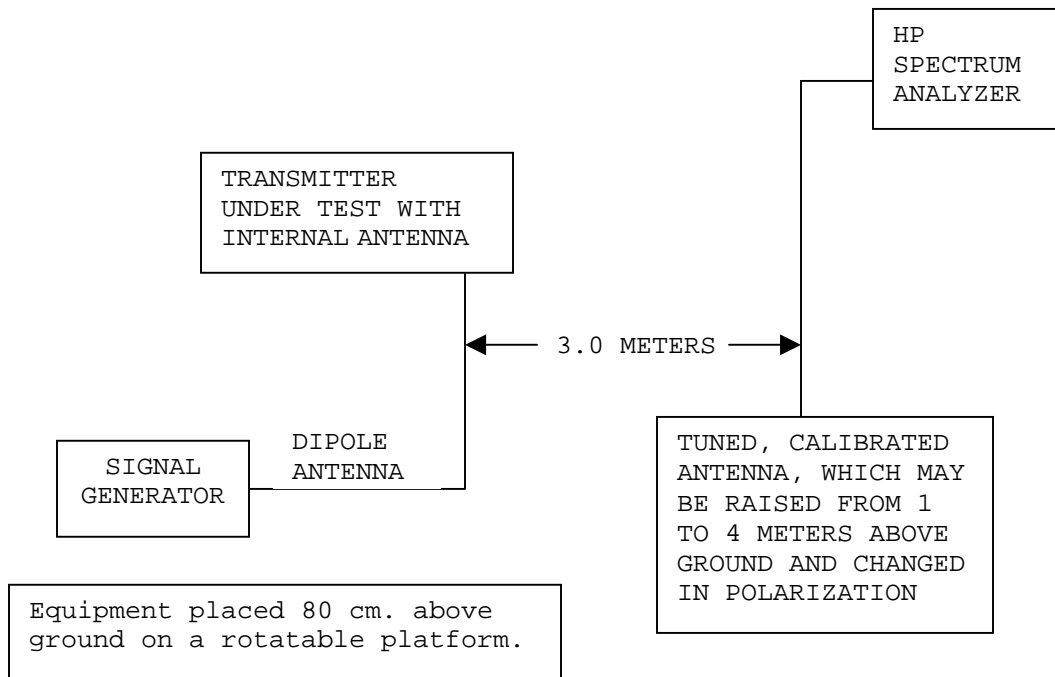
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- 2.1033(c)(12) Complete Circuit Diagrams: The circuit diagram are included in the exhibits.
- (13) Description of all circuitry and devices provided for determining and stabilizing frequency is given in the exhibits.
- 2.1033(c)(14) The Equipment identification is shown in the exhibits.
- 2.1033(c)(15) Photographs of the equipment are shown in the exhibits.
- 2.1033(c)(16) Equipment employing Digital modulation. N/A.
- 2.1033(c)(17) The data required by 2.1046-2.1057 follows;
- 2.1046 RF power is measured by the ERP METHOD. There are no provisions to limit the power. With a nominal battery voltage of 12.0 VDC, and the transmitter properly adjusted the RF output measures:

$P_o = 0.164$ Watts RADIATED SUBSTITUTION

2.1046 RF power output.



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2.1047 Modulation characteristics:

AUDIO FREQUENCY RESPONSE

The Voice is NOT allowed in this band.

2.1049 Occupied bandwidth:
95.635 (b)

- (1) At least 25dB on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.
- (3) At least 55 dB on any frequency removed from the center of the authorized bandwidth by more than 125% up to and including 250% of the authorized bandwidth.
- (7) At least $43 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.
- (10) At least 45 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 125% of the authorized bandwidth.
- (11) At least 55 dB on any frequency removed from the center of the authorized bandwidth by more than 125% up to and including 250% of the authorized bandwidth.
- (12) At least $56 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

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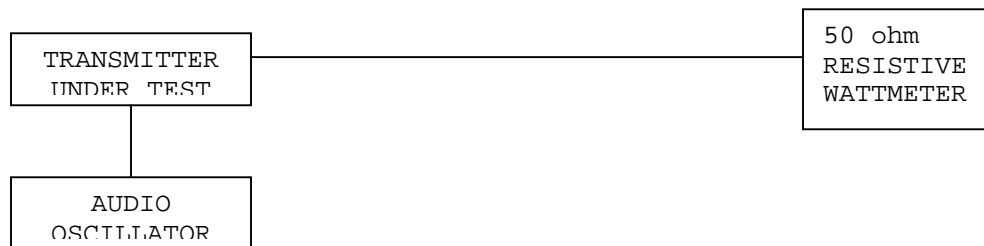
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Radiotelephone Transmitter with Modulation Limiter

Test Procedure Diagram

OCCUPIED BANDWIDTH MEASUREMENT



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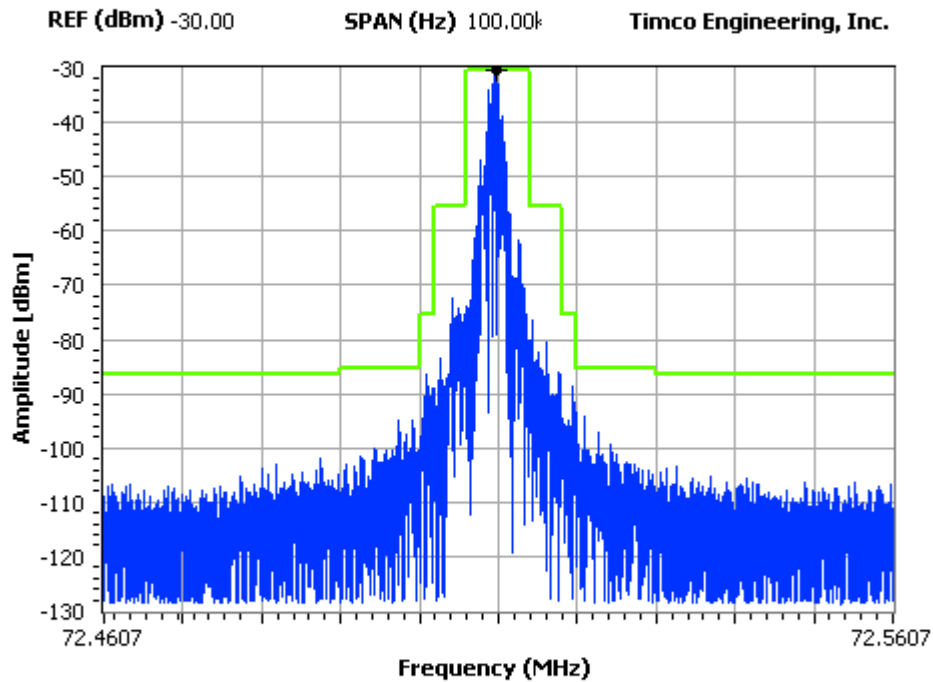
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OCCUPIED BANDWIDTH PLOT

NOTES:

2146ut5 occupied bandwidth

FCC 95.635 Mask (1) (10) (11) (12)



RBW	VBW	ST (sec)	Peak	72.510	-30.50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
300 Hz	100 kHz	8	MKR2	0.000	0.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Center Frequency (Hz) 72.511M			MKR3	0.000	0.00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marker Delta (Hz) 0.00			HWMK	23.076	6.27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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2.1051 **SPURIOUS EMISSIONS AT ANTENNA TERMINALS**
NOT APPLICABLE, NO antenna port. This UUT has a permanently attached antenna.

2.1053 **UNWANTED RADIATION:**
95.635(1)(3)(7)(10)(11)(12)

REQUIREMENTS: At least $56 + 10\log(T)$ on any frequency removed from the center of the authorized bandwidth by more than 250%.

$$56 + 10\log(0.164) = 48.15 \text{ dB}$$

TEST DATA:

Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
72.50	0	22.70	0	-0.55	0
145.00	V	-29.10	0	-0.55	51.8
217.50	V	-42.00	0	-1.15	65.3
290.00	V	-44.20	0	-1.29	67.64
362.50	V	-50.50	0	-1.15	73.8
435.00	V	-57.40	0	-0.45	80
507.50	V	-53.30	0	-0.62	76.07
580.00	V	-48.60	0	-0.45	71.2
652.50	V	-48.00	0	0.13	70.02
725.00	V	-54.00	0	-0.15	76.3

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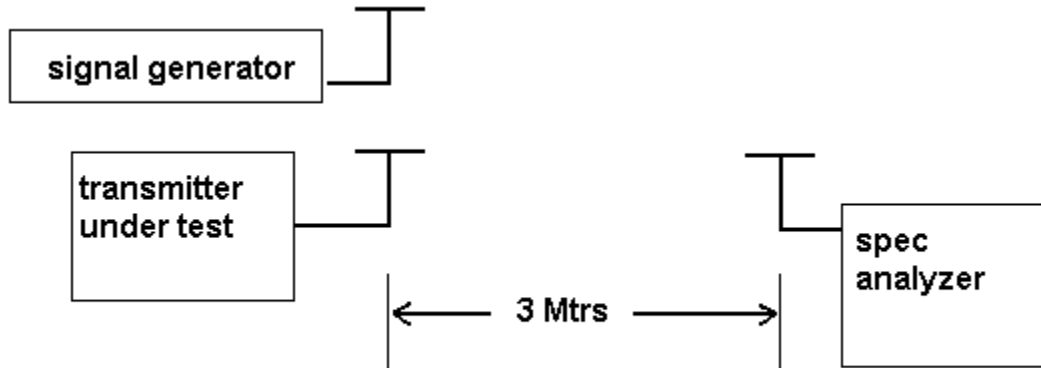
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Method of Measuring Radiated Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was C63.4-2003. The unit was operating into its permanently attached antenna at a height of 80 cm. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer and an appropriate antenna. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45 Newberry, FL 32669.

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2.1055(a)(1) Frequency stability:
95.623 (b)

Temperature and voltage tests were performed to verify that the frequency remains within the .002%, 20-ppm specification limit. The test was conducted as follows:

The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15-second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees C after which the transmitter was again allowed to stabilize for one Hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15-second intervals. The worst-case Number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

Readings were also taken at the end point of the battery voltage of 12.0VDC.

MEASUREMENT DATA:

Ref. Freq. 72.510925

	Data	PPM
-30C	72.51111	2.55
-20C	72.511351	5.87
-10C	72.51151	8.07
0C	72.511517	8.16
10C	72.511269	4.74
20C	72.510925	0.00
30C	72.510594	-4.56
40C	72.510368	-7.68
50C	72.51024	-9.45

Batt. Volts	Batt. Data	Batt. PPM
-15%	72.510921	-0.06
+15%	72.51093	0.07

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EMC Equipment List

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 9/23/03	9/23/05
Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 9/23/03	9/23/05
Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 9/23/03	9/23/05
Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 9/23/03	9/23/05
Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Log-Periodic Antenna	Electro-Metrics	LPA-25	1122	CAL 8/26/04	8/26/06
Double-Ridged Horn Antenna	Electro-Metrics	RGA-180	2319	CAL 12/29/04	12/29/06
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/04	8/27/06
Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 7/16/04	7/16/06
Oscilloscope System One	Tektronix Audio Precision	2230 System One	300572 SYS1-45868	CAL 7/3/03 CHAR 4/25/02	7/3/05 4/25/04
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 1/22/02	1/22/04
Digital Multimeter	Fluke	77	35053830	CAL 8/1/05	8/1/07
Peak Power Meter	HP	8900C	2131A00545	CAL 7/2/03	7/2/05
Power Sensor	Agilent Technologies	84811A	2551A02705	CAL 7/2/03	7/2/05
Power Meter	HP	432A	1141A07655	CAL 4/11/05	4/11/07
Digital Thermometer	Fluke	2166A	42032	CAL 7/19/04	7/19/06
Frequency Counter	HP	5352B	2632A00165	CAL 8/3/04	8/3/06
Service Monitor	IFR	FM/AM 500A	5182	CAL 11/5/04	11/5/06
Signal Generator	HP	8640B	2308A21464	CAL 8/26/04	8/26/06
Modulation Analyzer	HP	8901A	3435A06868	CAL 11/4/04	11/4/06
Egg Timer	Unk			CHAR 2/1/02	2/1/04
Measuring Tape-20M	Kraftixx	0631-20		CHAR 2/1/02	2/1/04

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