

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: RF-ID TOY (WIRELESS DEVICE) - TX

FCC ID: BY380891

Applicant:

SCIENTIFIC TOYS, LTD.
13/F., CHAI WAN INDUSTRIAL CENTRE
20 LEE CHUNG STREET CHAI WAN, HONG KONG

Date Receipt: 7/1/2003

Date Tested: 7/23/2003

APPLICANT: SCIENTIFIC TOYS, LTD.
FCC ID: BY380891
REPORT #: S\SCIENTIF\918HT3\918HT3TestReport.doc
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EMC Equipment List

Last Update: 6/27/03

	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	3-Meter OATS	TEI	N/A	N/A	Listed 1/13/03	1/13/06
X	3/10-Meter OATS	TEI	N/A	N/A	Listed 3/26/01	3/26/04
X	Receiver, Beige Tower Spectrum Analyzer RF Preselector Quasi-Peak Adapter Preamplifier	HP	8566B Opt 462	3138A07786 3144A20661	CAL 8/31/01	8/31/03
X		HP	85685A	3221A01400	CAL 8/31/01	8/31/03
X		HP	85650A	3303A01690	CAL 8/31/01	8/31/03
X		HP	8449B-H02	3008A00372	CHAR 3/4/01	3/4/03
		Receiver, Blue Tower Spectrum Analyzer RF Preselector Quasi-Peak Adapter	HP	8568B	2928A04729 2848A18049	CAL 4/15/03
		HP	85685A	2926A00983	CAL 4/15/03	4/15/05
		HP	85650A	2811A01279	CAL 4/15/03	4/15/05
	Receiver, Silver/Grey Tower Spectrum Analyzer RF Preselector Quasi-Peak Adapter Preamplifier	HP	8566B Opt 462	3552A22064 3638A08608	CAL 10/14/02	10/14/04
		HP	85685A	2620A00294	CAL 10/14/02	10/14/04
		HP	85650A	3303A01844	CAL 10/14/02	10/14/04
		HP	8449B	3008A01075	CHAR 1/28/02	1/28/04
	Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/26/01	4/26/03

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	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/03
X	Biconnical Antenna	Eaton	94455-1	1057	CAL 3/18/03	3/18/05
	BiconiLog Antenna	EMCO	3143	9409-1043		
	Log-Periodic Antenna	Electro-Metrics	LPA-25	1122	CAL 10/2/01	10/2/03
	Log-Periodic Antenna	Electro-Metrics	EM-6950	632	CHAR 10/15/01	10/15/03
	Log-Periodic Antenna	Electro-Metrics	LPA-30	409	CAL 3/4/03	3/4/05
	Log-Periodic Antenna	Eaton	96005	1243	CAL 5/8/03	5/8/05
	Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	152	CAL 3/21/01	3/21/04
	Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	153	CAL 9/26/02	9/26/05
	Double-Ridged Horn Antenna	Electro-Metrics	RGA-180	2319	CAL 2/17/03	2/17/05
	Horn Antenna *(at 3 meters)	Electro-Metrics	EM-6961	6246	CAL 3/31/03	3/31/05
	Horn Antenna *(at 10 meters)	Electro-Metrics	EM-6961	6246	CAL 6/4/03	6/4/05
	Horn Antenna	ATM	19-443-6R	None	No Cal Required	
X	Passive Loop Antenna	EMC Test Systems	EMCO 6512	9706-1211	CHAR 7/10/01	7/10/03
	Harmonic Mixer with Horn Antenna	Oleson Microwave Labs	M08HW/A	F30425-1	CHAR 4/25/03	4/25/05
	Harmonic Mixer with Horn Antenna	Oleson Microwave Labs	M12HW/A	E30425-1	CHAR 4/25/03	4/25/05
	Line Impedance Stabilization . . .	Electro-Metrics	ANS-25/2	2604	CAL 10/9/01	10/9/03

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	Line Impedance Stabilization . . .	Electro-Metrics	EM-7820	2682	CAL 3/12/03	3/12/05
	Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 5/25/99	5/25/01
	Termaline Wattmeter	Bird Electronic Corporation	6104	1926	CHAR 12/12/01	12/12/03
	Oscilloscope	Tektronix	2230	300572	CHAR 2/1/01	2/1/03
	System One	Audio Precision	System One	SYS1-45868	CHAR 4/25/02	4/25/04
	Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 1/22/02	1/22/04
	AC Voltmeter	HP	400FL	2213A14499	CAL 10/9/01	10/9/03
	AC Voltmeter	HP	400FL	2213A14261	CHAR 10/15/01	10/15/03
	AC Voltmeter	HP	400FL	2213A14728	CHAR 10/15/01	10/15/03
	Digital Multimeter	Fluke	77	35053830	CHAR 1/8/02	1/8/04
	Digital Multimeter	Fluke	77	43850817	CHAR 1/8/02	1/8/04
	Digital Multimeter	HP	E2377A	2927J05849	CHAR 1/8/02	1/8/04
X	Multimeter	Fluke	FLUKE-77-3	79510405	CHAR 9/26/01	9/26/03
	Peak Power Meter	HP	8900C	2131A00545	CHAR 1/26/01	1/26/03
	Power Meter	HP	432A	1141A07655	CAL 4/15/03	4/15/05
	Power Meter And Sensor	Bird	4421-107 4022	0166 0218	CAL 4/16/03	4/16/05
	Power Sensor	HP	478A	72129	CAL 4/15/03	4/15/05
	Digital Thermometer	Fluke	2166A	42032	CAL 1/16/02	1/16/04

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	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	Thermometer	Traulsen	SK-128		CHAR 1/22/02	1/22/04
	Thermometer	Extech	4028	14871-2	CAL 3/7/03	3/7/05
X	Hygro-Thermometer	Extech	445703	0602	CAL 10/4/02	10/4/04
	Frequency Counter	HP	5352B	2632A00165	CAL 11/28/01	11/28/03
	Frequency Counter	HP	5385A	2730A03025	CAL 3/7/03	3/7/05
	Power Sensor	Agilent Technologies	84811A	2551A02705	CHAR 1/26/01	1/26/03
	Service Monitor	IFR	FM/AM 500A	5182	CAL 11/22/00	11/22/02
	Comm. Serv. Monitor	IFR	FM/AM 1200S	6593	CAL 5/12/02	5/12/04
	Signal Generator	HP	8640B	2308A21464	CAL 2/15/02	2/15/04
	Sweep Generator	Wiltron	6648	101009	CAL 4/15/03	4/15/05
	Sweep Generator	Wiltron	6669M	007005	CAL 3/3/03	3/3/05
	Modulation Analyzer	HP	8901A	3435A06868	CAL 9/5/01	9/5/03
	Modulation Meter	Boonton	8220	10901AB	CAL 4/15/03	4/15/05
	Near Field Probe	HP	HP11940A	2650A02748	CHAR 2/1/01	2/1/03
	BandReject Filter	Lorch Microwave	5BR4-2400/ 60-N	Z1	CHAR 3/2/01	3/2/03
	BandReject Filter	Lorch Microwave	6BR6-2442/ 300-N	Z1	CHAR 3/2/01	3/2/03
	BandReject Filter	Lorch Microwave	5BR4-10525/ 900-S	Z1	CHAR 3/2/01	3/2/03
	Notch Filter	Lorch Microwave	5BRX-850/ X100-N	AD-1	CHAR 4/17/03	4/17/05

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	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	High Pass Filter	Unk	3768(5)-400	041	CHAR 12/17/02	12/17/04
	High Pass Filter	Microlab	HA-10N		CHAR 10/4/01	10/4/03
	High Pass Filter	Microlab	HA-20N		CHAR 2/7/03	2/7/05
	Audio Oscillator	HP	653A	832-00260	CHAR 3/1/01	3/1/03
	Audio Generator	B&K Precision	3010	8739686	CHAR 12/1/02	12/1/04
	Frequency Counter	HP	5382A	1620A03535	CHAR 3/2/01	3/2/03
	Frequency Counter	HP	5385A	3242A07460	CAL 3/7/03	3/7/05
	Amplifier	HP	11975A	2738A01969	CHAR 3/1/01	3/1/03
	Egg Timer	Unk			CHAR 8/31/01	8/31/03
	Measuring Tape, 20M	Kraftixx	0631-20		CHAR 2/1/02	2/1/04
X	Measuring Tape, 7.5M	Kraftixx	7.5M PROFI		2/1/02	2/1/04
	Coaxial Cable #51	Insulated Wire Inc.	NPS 2251- 2880	Timco #51	CHAR 1/23/02	1/23/04
X	Coaxial Cable #64	Semflex Inc.	60637	Timco #64	CHAR 1/24/02	1/24/04
	Coaxial Cable #65	General Cable Co.	E9917 RG233/U	Timco #65	CHAR 1/23/02	1/23/04
	Coaxial Cable #106	Unknown	Unknown	Timco #106	CHAR 1/23/02	1/23/04

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TEST PROCEDURES

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. In the frequency range 10 kHz to 30 MHz the RBW was 10 kHz and from 30-1000 MHz the RBW of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz. The ambient temperature of the UUT was 95 degrees with a humidity of 40 percent.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF = FS
33 20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI C63.4-1992 Section 8.2.1 MEASUREMENT PROCEDURES: The EUT was placed on a non-conducting table 80 cm above the ground plane with the EUT located in the center of the table. With the antenna vertical a preliminary scan was done at 1 meters distance, the EUT was moved to a 3.0-meter distance and the antenna height varied and also placed in a horizontal position. The frequency was scanned from 9.0 kHz to 1.0 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The EUT was measured in three (3) orthogonal planes. The unit was measured at TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45 Newberry, Florida 32669.

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APPLICANT: SCIENTIFIC TOYS, LTD.

FCC ID: BY380891

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO: 15.225 and 15.209

REQUIREMENTS: THE FIELD STRENGTH OF ANY EMISSION WITHIN THE BAND OF 13.553-13.57 MHz SHALL NOT EXCEEDS 80 dBuV/m @ 30 meters or 120 dBuV/m at 3 meters.

THE FIELD STRENGTH OF ANY EMISSIONS APPEARING OUTSIDE OF THIS BAND SHALL NOT EXCEED THE GENERAL RADIATED EMISSION LIMITS SHOWN IN §15.209.

9 to 490 KHz: 2400/F (kHz) uV/m @ 300 METERS
490 to 1705 KHz: 24000/F (kHz) uV/m @ 30 METERS
1705 to 30 MHz: 29.54 dBuV/M @ 30 METERS
30 to 88 MHz: 40.00 dBuV/M @ 3 METERS
88 to 216 MHz: 43.50 dBuV/M
216 to 960 MHz: 46.02 dBuV/M
ABOVE 960 MHz: 54.00 dBuV/M

TEST DATA:

Emission Frequency MHz	Meter Reading dBuV	ANT. POLARITY	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
13.56	17.6	V	0.20	35.52	53.32	66.68
13.56	17.8	H	0.20	35.52	53.52	66.48
27.12	11.8	H	0.24	13.44	25.48	44.02
27.12	16.9	V	0.24	13.44	30.58	38.92
40.68	12.5	H	0.30	13.49	26.29	13.71
40.68	14.9	V	0.30	13.49	28.69	11.31
54.24	16.6	H	0.80	10.05	27.45	12.55
54.24	21.6	V	0.80	10.05	32.45	7.55
67.80	20.0	V	0.80	5.23	26.03	13.97
67.80	26.9	H	0.80	5.23	32.93	7.07
81.36	17.4	H	0.80	8.45	26.65	13.35
81.36	22.7	V	0.80	8.45	31.95	8.05
108.48	13.1	H	0.80	10.10	24.00	19.50
108.48	15.7	V	0.80	10.10	26.60	16.90
122.04	11.7	H	0.80	10.69	23.19	20.31
122.04	14.7	V	0.80	10.69	26.19	17.31
135.60	15.1	H	0.84	13.89	29.83	13.67
135.60	17.1	V	0.84	13.89	31.83	11.67

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APPLICANT: SCIENTIFIC TOYS, LTD.
FCC ID: BY380891
NAME OF TEST: RADIATION INTERFERENCE CONTD.
RULES PART NO. 15.225 and 15.209
SAMPLE CALCULATION: $FSdBuV/m = MR (dBuV) + ACFdB.$

TEST PROCEDURE: The procedure used was ANSI C63.4-1992 Section 8.2. The frequency was scanned from 9.0 kHz to 1.0 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The EUT was measured in three (3) orthogonal planes. The unit was measured at TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45 Newberry, Florida 32669.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: NAM NGUYEN **DATE:** 7/23/2003

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2.1055 Frequency stability:

Temperature and voltage tests were performed to verify that the frequency tolerance of the carrier signal remains within the -0.01% of the operating frequency over a temperature variation of -20 degrees C to +50 degrees C at normal supply voltage and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. 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 -20 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 minus 15% of the battery voltage of 6 VDC.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 13.561433

TEMPERATURE °C	FREQUENCY MHz	PPM
REFERENCE_____	13.561433	0.0
-20_____	13.561424	-0.66
-10_____	13.561420	-0.96
0_____	13.561424	-0.66
+10_____	13.561426	-0.52
+20_____	13.561433	0.00
+30_____	13.561436	0.22
+40_____	13.561447	1.03
+50_____	13.561467	2.51

BATT. End-Point 5.1V/dc 13.561449 1.18

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -0.96 to + 2.51 ppm. The maximum frequency variation with voltage was 1.18 ppm.

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APPLICANT: SCIENTIFIC TOYS, LTD.

FCC ID: BY3 80891

NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.225

REQUIREMENTS: The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated to the general limits of 15.209.

THE GRAPH ON THE NEXT PAGE REPRESENTS THE EMISSIONS TAKEN FOR THE DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was taken. The vertical scale is set to 10 dB per division. The horizontal scale is set to 5 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: NAM NGUYEN

DATE: 7/23/2003

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OCCUPIED BANDWIDTH PLOT LINE 1

