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FCC ID: BY331991T

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Equipment List

| | DEVICE | MFGR | MODEL | SERNO | CAL/CHAR DATE | DUE DATE or STATUS |
|---|---|------------------|---------------|--------------------------|--------------------|--------------------|
| X | 3-Meter OATS | TEI | N/A | N/A | Listed 12/22/99 | 12/22/02 |
| | 3/10-Meter OATS | TEI | N/A | N/A | Listed 3/26/01 | 3/26/04 |
| X | Receiver, Beige Tower Spectrum Analyzer (Tan) RF Preselector (Tan) Quasi-Peak Adapter (Tan) | HP | 8566B Opt 462 | 3138A07786 3144A20661 | CAL 8/31/01 | 8/31/02 |
| X | | HP | 85685A | 3221A01400 | CAL 8/31/01 | 8/31/02 |
| X | | HP | 85650A | 3303A01690 | CAL 8/31/01 | 8/31/02 |
| | | HP | 8568B | 2928A04729 2848A18049 | CHAR 10/22/01 | 10/22/02 |
| | RF Preselector (Blue) | HP | 85685A | 2926A00983 | CHAR 10/22/01 | 10/22/02 |
| | Quasi-Peak Adapter (Blue) | HP | 85650A | 2811A01279 | CHAR 10/22/01 | 10/22/02 |
| | Biconnical Antenna | Electro-Metrics | BIA-25 | 1171 | CAL 4/26/01 | 4/26/03 |
| X | Biconnical Antenna | Eaton | 94455-1 | 1096 | CAL 10/1/01 | 10/1/02 |
| | Biconnical Antenna | Eaton | 94455-1 | 1057 | CHAR 3/15/00 | 3/15/01 |
| | BiconiLog Antenna | EMCO | 3143 | 9409-1043 | | |
| X | Log-Periodic Antenna | Electro-Metrics | LPA-25 | 1122 | CAL 10/2/01 | 10/2/02 |
| | Log-Periodic Antenna | Electro-Metrics | EM-6950 | 632 | CHAR 10/15/01 | 10/15/02 |
| | Log-Periodic Antenna | Electro-Metrics | LPA-30 | 409 | CHAR 10/16/01 | 10/16/02 |
| | Dipole Antenna Kit | Electro-Metrics | TDA-30/1-4 | 152 | CAL 3/21/01 | 3/21/02 |
| | Dipole Antenna Kit | Electro-Metrics | TDA-30/1-4 | 153 | CHAR 11/24/00 | 11/24/01 |
| | Double-Ridged Horn Antenna | Electro-Metrics | RGA-180 | 2319 | CAL 12/19/01 | 12/19/02 |
| | Horn Antenna | Electro-Metrics | EM-6961 | 6246 | CAL 3/21/01 | 3/21/02 |
| | Horn Antenna | ATM | 19-443-6R | None | No Cal Required | |
| | Passive Loop Antenna | EMC Test Systems | EMCO 6512 | 9706-1211 | CHAR 7/10/01 | 7/10/02 |

| | DEVICE | MFGR | MODEL | SERNO | CAL/CHAR DATE | DUE DATE or STATUS |
|---|--|-------------------------------|----------------|--------------|----------------------|---------------------------|
| | Line Impedance Stabilization . . . | Electro-Metrics | ANS-25/2 | 2604 | CAL 10/9/01 | 10/9/02 |
| | Line Impedance Stabilization . . . | Electro-Metrics | EM-7820 | 2682 | CAL 3/16/01 | 3/16/02 |
| | Termaline Wattmeter | Bird Electronic Corporation | 611 | 16405 | CAL 5/25/99 | (5/25/00) |
| | Termaline Wattmeter | Bird Electronic Corporation | 6104 | 1926 | CAL 12/12/01 | 12/12/02 |
| | Oscilloscope | Tektronix | 2230 | 300572 | CHAR 2/1/01 | 2/1/02 |
| | Temperature Chamber | Tenney Engineering | TTRC | 11717-7 | CHAR 1/22/02 | 1/22/03 |
| | AC Voltmeter | HP | 400FL | 2213A14499 | CAL 10/9/01 | 10/9/02 |
| | AC Voltmeter | HP | 400FL | 2213A14261 | CHAR 10/15/01 | 10/15/02 |
| | AC Voltmeter | HP | 400FL | 2213A14728 | CHAR 10/15/01 | 10/15/02 |
| X | Digital Multimeter | Fluke | 77 | 35053830 | CHAR 1/8/02 | 1/8/03 |
| | Digital Multimeter | Fluke | 77 | 43850817 | CHAR 1/8/02 | 1/8/03 |
| | Digital Multimeter | HP | E2377A | 2927J05849 | CHAR 1/8/02 | 1/8/03 |
| | Multimeter | Fluke | FLUKE-77-3 | 79510405 | CAL 9/26/01 | 9/26/02 |
| | Peak Power Meter | HP | 8900C | 2131A00545 | CHAR 1/26/01 | 1/26/02 |
| | Digital Thermometer | Fluke | 2166A | 42032 | CAL 1/16/02 | 1/16/03 |
| | Thermometer | Traulsen | SK-128 | | CHAR 1/22/02 | 1/22/03 |
| X | Temp/Humidity gauge | EXTech | 44577F | E000901 | CHAR 1/22/02 | 1/22/03 |
| | Frequency Counter | HP | 5352B | 2632A00165 | CAL 11/28/01 | 11/28/02 |
| | Power Sensor | Agilent Technologies | 84811A | 2551A02705 | CAL 1/26/01 | 1/26/02 |
| | Injection Probe | Fischer Custom Communications | F-120-9A | 270 | CAL 6/1/01 | 6/1/02 |
| | Service Monitor | IFR | FM/AM 500A | 5182 | CAL 11/22/00 | 11/22/01 |
| | Comm. Serv. Monitor | IFR | FM/AM 1200S | 6593 | CAL 11/12/99 | 11/12/00 |
| | Signal Generator | HP | 8640B | 2308A21464 | CAL 11/15/01 | 11/15/02 |
| | Modulation Analyzer | HP | 8901A | 3435A06868 | CAL 9/5/01 | 9/5/02 |
| | Power Line Coupling/Decoupling Network | Fischer Custom Communications | FCC-801-M2-16A | 01048 | CAL 8/29/01 | 8/29/02 |

| | DEVICE | MFGR | MODEL | SERNO | CAL/CHAR DATE | DUE DATE or STATUS |
|--|--|----------------------------------|--------------------------|---------------|----------------------|---------------------------|
| | Power Line Coupling/ Decoupling Network | Fischer Custom Communications | FCC-801-M3- 16A | 01060 | CAL 8/29/01 | 8/29/02 |
| | VHF/UHF Current Probe | Fischer Custom Communications | F-52 | 130 | CAL 8/30/01 | 8/30/02 |
| | Passive Impedance Adapter | Fischer Custom Communications | FCC-801-150- 50-CDN | 01117 & 01118 | CAL 8/29/01 | 8/29/02 |
| | Radiating Field Coil | Fischer Custom Communications | F-1000-4- 8/9/10-L-1M | 9859 | CAL 10/15/98 | 10/15/99 |
| | Near Field Probe | HP | HP11940A | 2650A02748 | CHAR 2/1/01 | 2/1/02 |
| | BandReject Filter | Lorch Microwave | 5BR4-2400/ 60-N | Z1 | CHAR 3/2/01 | 3/2/02 |
| | BandReject Filter | Lorch Microwave | 6BR6-2442/ 300-N | Z1 | CHAR 3/2/01 | 3/2/02 |
| | BandReject Filter | Lorch Microwave | 5BR4-10525/ 900-S | Z1 | CHAR 3/2/01 | 3/2/02 |
| | High Pas Filter | Microlab | HA-10N | | CHAR 10/4/01 | 10/4/02 |
| | Audio Oscillator | HP | 653A | 832-00260 | CHAR 3/1/01 | 3/1/02 |
| | Frequency Counter | HP | 5382A | 1620A03535 | CHAR 3/2/01 | 3/2/02 |
| | Frequency Counter | HP | 5385A | 3242A07460 | CHAR 12/11/01 | 12/11/02 |
| | Preamplifier | HP | 8449B-H02 | 3008A00372 | CHAR 3/4/01 | 3/4/02 |
| | Amplifier | HP | 11975A | 2738A01969 | CHAR 3/1/01 | 3/1/02 |
| | Egg Timer | Unk | | | CHAR 2/28/01 | 2/28/02 |
| | Measuring Tape, 20M | Kraftixx | 0631-20 | | CHAR 2/28/01 | 2/28/02 |
| | Measuring Tape, 7.5M | Kraftixx | 7.5M PROFI | | CHAR 2/28/01 | 2/28/02 |
| | EMC Immunity Test System | Keytek | CEMASTER | 9810210 | | |
| | AC Power Source | California Instruments | 1251RP | L05865 | | |
| | AC Power Source | California Instruments | PACS-1 | X71484 | | |
| | Isotropic Field Probe | Amplifier Research | FP5000 | 22839 | | |
| | Isotropic Field Probe | Amplifier Research | FP5000 | 300103 | | |
| | Capacitor Clamp | Keytek | CM-CCL | 9811359 | No Cal Required | |
| | Amplifier | Amplifier Research | 10W1000B | 23117 | No Cal Required | |
| | Field Monitor | Amplifier Research | FM5004 | 22288 | No Cal Required | |

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| | DEVICE | MFGR | MODEL | SERNO | CAL/CHAR DATE | DUE DATE or STATUS |
|--|--------------------|---------------------|---------------|----------------|--------------------------|-------------------------------|
| | ELF Meter | F. W. Bell | 4060 | Not serialized | | |
| | Coaxial Cable #51 | Insulated Wire Inc. | NPS 2251-2880 | Timco #51 | CHAR 1/23/02 | 1/23/03 |
| | Coaxial Cable #64 | Semflex Inc. | 60637 | Timco #64 | CHAR 1/24/02 | 1/24/03 |
| | Coaxial Cable #65 | General Cable Co. | E9917 RG233/U | Timco #65 | CHAR 1/23/02 | 1/23/03 |
| | Coaxial Cable #106 | Unknown | Unknown | Timco #106 | CHAR 1/23/02 | 1/23/03 |

TEST PROCEDURE

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. The bandwidth 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 100kHz and the video bandwidth was 300kHz. The ambient temperature of the UUT was 88°F with a humidity of 32%.

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 STANDARD C63.4-1992 10.1.7 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings were converted to average readings based on the duration of "ON" time.

Measurements were made by TIMCO ENGINEERING INC. at the registered open field test site located at 849 N.W. State Road 45, Newberry, FL 32669.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

APPLICANT: SCIENTIFIC TOYS, LTD.

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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.231

REQUIREMENTS:

| Fundamental Frequency MHz | Field Strength of Fundamental dBuV | Field Strength of Harmonics and Spurious Emissions (dBuV/m @ 3m) |
|---------------------------|------------------------------------|--|
| 40.66 to 40.70 | 67.04 | 47.04 |
| 70 to 130 | 61.94 | 41.94 |
| 130 to 174 | 61.94 to 71.48 | 41.94 to 51.48 |
| 174 to 260 | 71.48 | 51.48 |
| 260 to 470 | 71.48 to 81.94 | 51.48 to 61.94 |
| 470 and above | 81.94 | 61.94 |

THE LIMIT FOR AVERAGE FIELD STRENGTH dBuV/m FOR THE FUNDAMENTAL FREQUENCY= 75.55 dBuV/m dBuV/m. NO FUNDAMENTAL IS ALLOWED IN THE RESTRICTED BANDS.

THE LIMIT FOR AVERAGE FIELD STRENGTH dBuV/m FOR THE HARMONICS AND SPURIOUS FREQUENCIES = 55.55 dBuV/m dBuV/m. SPURIOUS IN THE RESTRICTED BANDS MUST BE LESS THAN 54dBuV/m OR 15.209.

TEST DATA:

| Tuned Frequency MHz | Emission Frequency MHz | Meter Reading dBuV | Ant. Polarity | Coax Loss dB | Correction Factor dB | Duty Cycle Factor dB | Field Strength dBuV/m | Margin dB |
|---------------------|------------------------|--------------------|---------------|--------------|----------------------|----------------------|-----------------------|-----------|
| 313.80 | 313.80 | 52.0 | H | 2.28 | 14.30 | 6.10 | 62.48 | 13.07 |
| 313.80 | 313.80 | 44.7 | V | 2.28 | 14.30 | 6.10 | 55.18 | 20.37 |
| 313.80 | 313.80 | 57.7 | H | 2.28 | 14.30 | 6.10 | 68.18 | 7.37 |
| 313.80 | 313.80 | 55.0 | V | 2.28 | 14.30 | 6.10 | 65.48 | 10.07 |
| 313.80 | 313.80 | 50.5 | H | 2.28 | 14.30 | 6.10 | 60.98 | 14.57 |
| 313.80 | 313.80 | 54.6 | V | 2.28 | 14.30 | 6.10 | 65.08 | 10.47 |
| 313.80 | 627.40 | 24.4 | V | 3.48 | 19.37 | 6.10 | 41.15 | 14.40 |
| 313.80 | 627.40 | 28.7 | H | 3.48 | 19.37 | 6.10 | 45.45 | 10.10 |
| 313.80 | 627.40 | 23.1 | V | 3.48 | 19.37 | 6.10 | 39.85 | 15.70 |
| 313.80 | 627.40 | 30.5 | H | 3.48 | 19.37 | 6.10 | 47.25 | 8.30 |
| 313.80 | 627.50 | 25.0 | H | 3.48 | 19.38 | 6.10 | 41.76 | 13.79 |
| 313.80 | 627.50 | 21.9 | V | 3.48 | 19.38 | 6.10 | 38.66 | 16.89 |
| 313.80 | 941.10 | 6.0 | H | 3.28 | 23.81 | 6.10 | 26.99 | 28.57 |
| 313.80 | 941.10 | 12.5 | V | 3.28 | 23.81 | 6.10 | 33.49 | 22.07 |
| 313.80 | 941.10 | 5.7 | H | 3.28 | 23.81 | 6.10 | 26.69 | 28.87 |
| 313.80 | 941.10 | 6.8 | V | 3.28 | 23.81 | 6.10 | 27.79 | 27.77 |
| 313.80 | 1255.40 | 22.5 | V | 2.22 | 26.14 | 6.10 | 44.76 | 10.79 |
| 313.80 | 1255.40 | 14.9 | H | 2.22 | 26.14 | 6.10 | 37.16 | 18.39 |

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APPLICANT: SCIENTIFIC TOYS, LTD.
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 NAME OF TEST: RADIATION INTERFERENCE CONTINUED

| Tuned Frequency Mhz | Emission Frequency MHz | Meter Reading dBuv | Ant. Polarity | Coax Loss dB | Correction Factor dB | Duty Cycle dB | Field Strength dBuv/m | Margin dB |
|---------------------|------------------------|--------------------|---------------|--------------|----------------------|---------------|-----------------------|-----------|
| 313.80 | 1255.40 | 14.7 | V | 2.22 | 26.14 | 6.10 | 36.96 | 18.59 |
| 313.80 | 1255.40 | 20.5 | H | 2.22 | 26.14 | 6.10 | 42.76 | 12.79 |
| 313.80 | 1255.40 | 16.1 | V | 2.22 | 26.14 | 6.10 | 38.36 | 17.19 |
| 313.80 | 1255.40 | 15.9 | H | 2.22 | 26.14 | 6.10 | 38.16 | 17.39 |
| 313.80 | 1569.30 | ** 13.6 | H | 2.55 | 28.25 | 6.10 | 38.30 | 15.70 |
| 313.80 | 1569.30 | ** 15.8 | V | 2.55 | 28.25 | 6.10 | 40.50 | 13.50 |
| 313.80 | 1569.30 | ** 14.8 | V | 2.55 | 28.25 | 6.10 | 39.50 | 14.50 |
| 313.80 | 1569.30 | ** 16.4 | H | 2.55 | 28.25 | 6.10 | 41.10 | 12.90 |
| 317.00 | 317.00 | 45.8 | V | 2.30 | 14.30 | 6.10 | 5.30 | 19.44 |
| 317.00 | 317.00 | 49.1 | H | 2.30 | 14.30 | 6.10 | 59.60 | 16.14 |
| 317.00 | 317.00 | 56.8 | H | 2.30 | 14.30 | 6.10 | 67.30 | 8.44 |
| 317.00 | 317.00 | 42.3 | V | 2.30 | 14.30 | 6.10 | 52.80 | 22.94 |
| 317.00 | 317.00 | 45.8 | H | 2.30 | 14.30 | 6.10 | 56.30 | 19.44 |
| 317.00 | 317.00 | 45.5 | V | 2.30 | 14.30 | 6.10 | 56.00 | 19.74 |
| 317.00 | 634.00 | 22.4 | H | 3.50 | 19.56 | 6.10 | 39.36 | 16.38 |
| 317.00 | 634.00 | 26.5 | V | 3.50 | 19.56 | 6.10 | 43.46 | 12.28 |
| 317.00 | 634.00 | 23.5 | H | 3.50 | 19.56 | 6.10 | 40.46 | 15.28 |
| 317.00 | 634.00 | 13.1 | V | 3.50 | 19.56 | 6.10 | 30.06 | 25.68 |
| 317.00 | 634.00 | 20.02 | H | 3.50 | 19.56 | 6.10 | 37.16 | 18.58 |
| 317.00 | 951.00 | 3.2 | V | 3.05 | 23.27 | 6.10 | 23.42 | 32.32 |
| 317.00 | 951.00 | 5.1 | V | 3.05 | 23.27 | 6.10 | 25.32 | 30.452 |
| 317.00 | 1268.00 | 12.1 | V | 2.23 | 26.25 | 6.10 | 34.48 | 21.26 |
| 317.00 | 1268.00 | 10.2 | V | 2.23 | 26.25 | 6.10 | 32.58 | 23.16 |
| 317.00 | 1268.00 | 8.10 | V | 2.23 | 26.25 | 6.10 | 30.48 | 25.26 |
| 317.00 | 1268.00 | 7.0 | H | 2.23 | 26.25 | 6.10 | 29.38 | 26.36 |

SAMPLE CALCULATION OF LIMIT @ 303 MHz:

$(470 - 260)\text{Mhz} = 210 \text{ MHz}$
 $(12500 - 3750)\text{uV/m} = 8750 \text{ uV/m}$
 $8750\text{uV/m}/210\text{MHz} = 41.67 \text{ uV/m/MHz}$
 $(303-260)\text{MHz} = 43 \text{ MHz}$
 $43 \text{ MHz} * 41.67 \text{ uV/m/MHz} = 1791.81 \text{ uV/m}$
 $(1791.81 + 3750)\text{uV/m} = 5541.81 \text{ uV/m limit @ 303 MHz}$

The transmitter ceases transmitting when the button is released.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: JOE SCOGLIO

DATE TESTED: MAY 28, 2002

APPLICANT: SCIENTIFIC TOYS, LTD.

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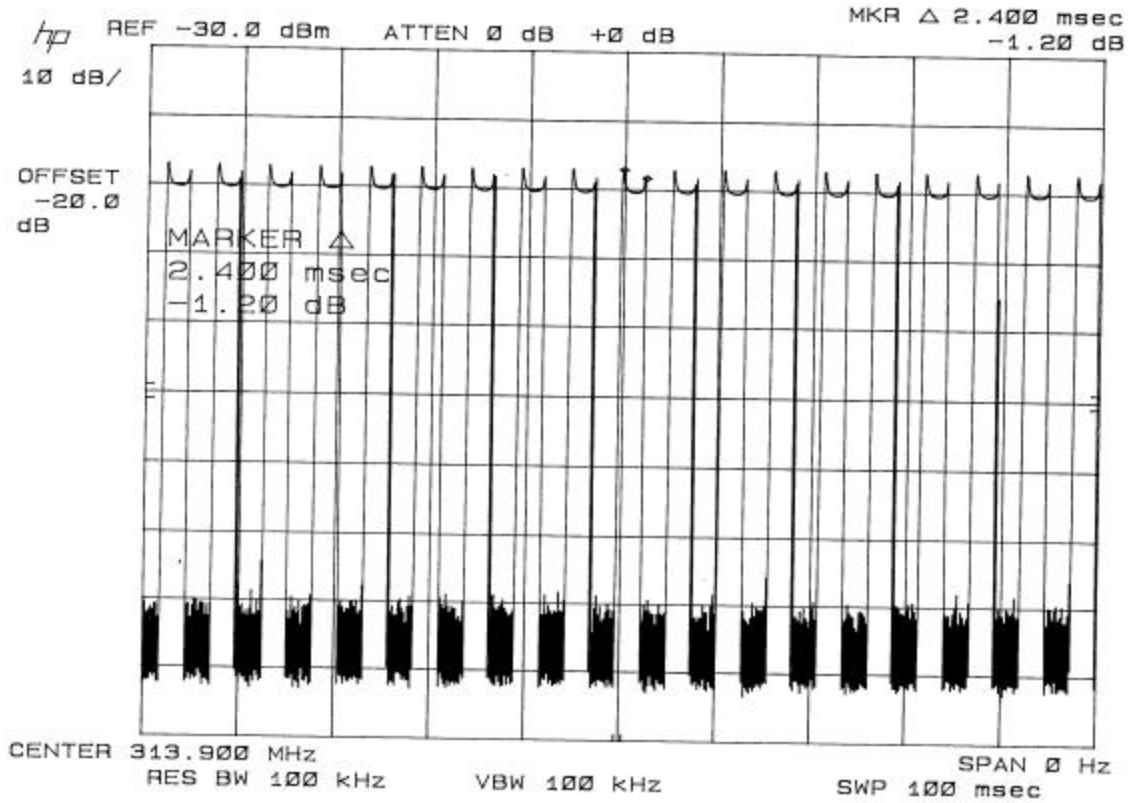
CALCULATION OF DUTY CYCLE:

This device uses a multivibrator circuit to create a 50% duty percent. The ON time is the same as the OFF time. Plots on the following 3 pages show this.

The following is not applicable to this device

The period of the pulse train is determined by observing it on an oscilloscope or a spectrum analyzer with zero(0) frequency span. A plot is then made of the pulse train with a sweep time of 100 mseconds. This sweep determines the duration of the pulse train, which in this case is milliseconds. This sweep allows the determination of the number of and type of pulses, i.e. long & short. Plots are then made showing the duration of each type of pulse and its duration. From the 100 msecond plot the number of a given type of pulse is then multiplied by the duration of that type pulse. This allows the calculation of the amount of time the UUT is on within 100 mseconds. If the pulse train is longer than 100 mseconds then this number is multiplied by 100 to determine the percentage ON time. If the pulse train is less than 100 mseconds the total on-time is divided by the length of the pulse train and then multiplied by 100 to determine the percentage ON time. In this case there were long pulses milliseconds long and pulses milliseconds long for a total of 100mseconds on time within either the 100 msec. or the pulse train. The average field strength is determined by multiplying the peak field strength by the percent on time. In this case the percentage ON time was 50 percent.

Duty Cycle Plot



APPLICANT: SCIENTIFIC TOYS, LTD.

FCC ID: BY331991T

NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.231(C)

REQUIREMENTS: The bandwidth of the emission shall be no wider than .25% of the center frequency for devices operating between 70 and 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

$$313.24 \text{ MHz} * .0025 = 0.7831 \text{ MHz}$$
$$0.7831 \text{ MHz} / 2 = +/- 391.55$$

THE GRAPH IN THE FOLLOWING PAGES 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 plot in exhibit 9 was generated. The vertical scale is set to 10 dB per division: the horizontal scale is set to 1 MHz per division.

TEST RESULTS: The unit meets the FCC requirements.

PERFORMED BY: JOE SCOGLIO

DATE: MAY 28, 2002

Occupied Bandwidth Plot

