| APPLICANT | MANUFACTURER |
|---|---|
| X-10 (USA), Inc.<br>400 Forge Way, Suite 412<br>Rockaway, NJ 07866-2033 | X-10 Electronics Shenzhen Co. Ltd.<br>X-10 Building<br>Labour Industrial District<br>Shenzhen, Xixiang, Bao An<br>Guang Dong, China, 518102 |

TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart C, Para. 15.231

TEST PROCEDURE: ANSI C63.4:1992

TEST SAMPLE DESCRIPTION

BRANDNAME: ATI Technologies, Inc. MODEL: UR84A

TYPE: Pulsed Transmitter

POWER REQUIREMENTS: 6 VDC derived from 4 New "AAA" Batteries

FREQUENCY OF OPERATION: 434 MHz

TESTS PERFORMED

Para. 15.231(a), Radiated Emissions, Fundamental and Harmonics

Para. 15.231(b), Radiated Emissions, Spurious Case

Para. 15.231(b), Duty Cycle Determination

Para. 15.231(c), Occupied Bandwidth

REPORT OF MEASUREMENTS

| | |
|---|---|
| Applicant: | X-10 (USA), Inc. |
| Device: | Pulsed Transmitter |
| FCC ID: | B4SUR84A |
| Power Requirements: | 6 VDC derived from 4 New "AAA" Batteries |
| Applicable Rule Section: | Part 15, Subpart C, Section 15.231 |

TEST RESULTS

| | |
|---|---|
| 15.231 (a): | This device is used as a remote control transmitter. |
| 15.231 (a)(1) & 15.231(a)(2): | The transmitter is manually operated and ceases transmission within 5 seconds after deactivation. |
| 15.231 (a)(3): | The transmitter does not perform periodic transmissions. |
| 15.231 (b): | The fundamental field strength did not exceed 11,000 µV/M (Average) at a test distance of 3 meters. In addition, the requirements of section 15.35 for averaging pulsed emissions and for limiting peak emissions were met.<br><br>The field strength of harmonic and spurious emissions did not exceed 1,100 µV/M (AVERAGE). |

DETERMINATION OF FIELD STRENGTH LIMITS

The field strength limits shown below are found in Section 15.231.

| Frequency | | | Limit | | |
|---|---|---|---|---|---|
| F1 | = | 260 | 3750 | = | L1 |
| Fo | = | 312 | | Lo | |
| F2 | = | 470 | 12500 | = | L2 |

The formula below was utilized to determine the limits:

Limit = L1 + [(Fo-F1)(L2-L1)/(F2-F1)]

Solving yields:

Fundamental Limit = 11,000 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 1,100 µV/M (AVERAGE) @ 3 Meters

DUTY CYCLE DETERMINATION

The unit's RF output was directly coupled to the input of the spectrum analyzer. The analyzer was set for a frequency span of 0Hz. The sweep time was then adjusted in order to display one full pulse train. The transmitter on time was then summed and compared to the time for one full cycle in order to obtain the duty cycle.( See plots for additional information)

| | | |
|---|---|---|
| Transmitter On Time | = | 17.125 milliseconds (maximum- worst case in 100 ms) |
| Transmitter Cycle Time | = | 74.5 |
| Transmitter Duty Cycle | = | 22.98 % |

CALCULATION:

| | | |
|---|---|---|
| 1 Large Pulse | = | 4.5 milliseconds |
| 21 x 625 µs (small pulse) | = | 13.125 milliseconds |
| 10.5 + 20.625 | = | 22.98 milliseconds |
| Duty Cycle | = | 22.98 % |
| Correction Factor = 20 log(0.248) | = | -12.77 |

SPECTRUM ANALYZER DESENSITIZATION CONSIDERATIONS

Due to the nature of the emissions being measured, care was taken to ensure that the resolution bandwidth of the spectrum analyzer was adequate to provide accurate measurements. The following formula was utilized:

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 625µs yields a minimum required bandwidth of 1.067 kHz. FCC specified bandwidths of 100kHz and 1MHz were utilized below and above 1GHz, respectively.

GENERAL NOTES

1. All readings were taken utilizing a peak detector function at a test distance of 3 meters.

2. The duty cycle was applied to the peak readings in order to determine the average value of the emissions.

3. The frequency range was scanned from 30 MHz to 4.5 GHz. All emissions not reported were more than 20 dB below the specified limit.

EQUIPMENT LIST

FCC15.231 Compliance Testing

| EN | Type | Manufacturer | Description | Model No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 067 | Open Area Test Site | Retlif | 3 Meter | RNY | 9/20/00 | 9/20/03 |
| 128C | Double Ridge Guide | Eaton Corporation | 1 GHz - 18 GHz | 96001 | 9/18/00 | 9/18/01 |
| 133 | Broadband Pre-Amplifier | Electro-Metrics | 10 kHz - 1 GHz, 26dB | BPA-1000 | 6/13/01 | 6/13/02 |
| 141A | Graphics Plotter | Hewlett Packard | N/A | 7470A | 3/5/01 | 3/5/02 |
| 206B | 6.0 dB Attenuator | Texscan | 0 - 1.0 GHz | FP-50 - 6 dB | 6/13/01 | 6/13/02 |
| 523 | Biconilog | Electro-Mechanics | 26 - 2000 MHz | 3142B | 6/8/00 | 9/8/01 |
| 543 | Preamplifier | Hewlett Packard | 1.0 GHz - 26.5 GHz | 8449B | 6/27/01 | 6/27/02 |
| 617 | Interference Analyzer | Electro-Metrics | 10 kHz - 1 GHz | EMC-30 | 2/27/01 | 2/27/02 |
| R105 | Spectrum Analyzer | Agilent | 9 kHz - 26.5 GHz | E4407B | 2/17/01 | 2/17/02 |

FCC 15.231(b)

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

See separate e-file attachment named REfundharm.pdf and REspur.pdf

FCC 15.231(c)

OCCUPIED BANDWIDTH

Please refer to separate electronic file named Occbw.pdf

FCC 15.231(c)

DUTY CYCLE

Please refer to separate electronic file named Dutycycle.pdf

Test Setup Photograph