

Device: Pulsed Transmitter
FCC ID: ESV-0407-7

REPORT OF MEASUREMENTS (continued)

TEST RESULTS

- 15.231 (a) - The device is used as a transmitter for security purposes.
- 15.231 (a)(1) & - The transmitter is manually **operated and ceases transmission within 5**
15.231(2) **seconds after deactivation.**
- 15.231 (a)(3) - The transmitter does perform periodic transmissions not more than once every 60 minutes.
- 15.231 (a)(4)- The device is employed for RC purposes involving security and when activated to signal an alarm, operates during the pendency of the alarm condition.
- 15.231 (b) - The fundamental field strength did not exceed 5590 $\mu\text{V/M}$ (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.
- The field strength of harmonic and spurious emissions did not exceed 559 $\mu\text{V/M}$ (AVERAGE).
- 15.231 (c) - The device operates at 304.1 MHz. The bandwidth of emissions did not exceed 0.25% of the operating frequency (760.25 kHz).

DETERMINATION OF FIELD STRENGTH LIMITS

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

Frequency				Limit
F1	=	260	3750	= L1
Fo	=	304		Lo
F2	=	470	12500	= L2

The formula below was utilized to determine the limits:

$$\text{Limit} = L1 + [(Fo-F1)(L2-L1)/(F2-F1)]$$

Solving yields:

$$\text{Fundamental Limit} = 5,590 \mu\text{V/M (AVERAGE) @ 3 Meters}$$

$$\text{Harmonic Limit} = 559 \mu\text{V/M (AVERAGE) @ 3 Meters}$$

REPORT OF MEASUREMENTS (continued)

DETERMINATION OF DUTY CYCLE

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 = 6.8 milliseconds (maximum- worst case in 100 ms)

Transmitter Cycle Time = 114.6 milliseconds

Transmitter Duty Cycle = 6.8 %

CALCULATION:

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 9.8 μ s yields a minimum required bandwidth of 6,802.7 Hz. FCC specified bandwidths of 100kHz and 1MHz were utilized below and above 1GHz, respectively.

REPORT OF MEASUREMENTS (continued)

GENERAL NOTES

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

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

All measurements were made with 3 VDC derived from a Panasonic CR123A Lithium Battery.

The frequency range was scanned from 30 MHz to 3.1 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
027	Oscilloscope	Tektronix	DC - 500 MHz	2440	5/20/02	5/20/03
067	Open Area Test Site	Retlif	3 Meter	RNY	9/20/00	9/20/03
128	Double Ridged Guide	Electro-Mechanics	1 GHz - 18 GHz	3105	6/7/02	6/7/03
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	6/11/02	6/11/03
141	Spectrum Analyzer	Hewlett Packard	100 Hz - 40 GHz	8566B	7/17/02	1/17/03
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	3/5/02	3/5/03
141B	Quasi-Peak Adaptor	Hewlett Packard	100 Hz - 1 GHz	85650A	7/16/02	1/16/03
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	6/11/02	6/11/03
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	7/11/02	7/11/03
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	8/23/02	8/23/03
767	Biconilog	EMCO	26 - 2000 MHz	3142B	9/3/02	9/3/03

FCC 15.231

RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE

Please refer to separate electronic file 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 PHOTOGRAPHS