APPLICANT	MANUFACTURER
Detection Systems, Inc. 130 Perinton Parkway Fairport, NY 14450	Detection Systems, Inc. 130 Perinton Parkway Fairport, NY 14450

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

TEST PROCEDURE: ANSI C63.4:1992

TEST SAMPLE DESCRIPTION

BRANDNAME: Detection Systems, Inc. MODEL: SEFD1

TYPE: Pulsed RF Transmitter

POWER REQUIREMENTS: 3 V derived from 2 "AAA" batteries

FREQUENCY OF OPERATION: 304 MHz

TESTS PERFORMED

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

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

Para. 15.231(c), Occupied Bandwidth

Duty Cycle Determination

REPORT OF MEASUREMENTS

Applicant: Detection Systems, Inc.

Device: Pulsed RF Transmitter

FCC ID: ESV-0117-06

REPORT OF MEASUREMENTS (continued)

TEST RESULTS

15.231 (a) - The device is used as a transmitter for security purposes.

15.231 (a)(1) & 15.231(2) - The transmitter is manually operated and ceases transmission within 5 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 5580 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.

The field strength of harmonic and spurious emissions did not exceed 558 µV/M (AVERAGE).

15.231 (c) - The device operates at 304 MHz. The bandwidth of emissions did not exceed 0.25% of the operating frequency (760 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	=	310			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 = 5,580 µV/M (AVERAGE) @ 3 Meters

Harmonic Limit = 558 µV/M (AVERAGE) @ 3 Meters

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	=	7.6 milliseconds (maximum- worst case in 100 ms)
Transmitter Cycle Time	=	> 100 milliseconds
Transmitter Duty Cycle	=	7.6 %

CALCULATION:

Please refer to separate electronic file named: SEFD1 Tech Info.jpg

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 100µs yields a minimum required bandwidth of 6,667 Hz. 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. All measurements were made with 3V derived from 2 “AAA” batteries.

4. 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

Radiated Emissions

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
128C	Double Ridge Guide	Eaton Corporation	1 GHz - 18 GHz	96001	09/18/2000	09/18/2001
133	Broadband Pre-Amplifier	Electro-Metrics	10 kHz - 1 GHz, 26dB	BPA-1000	06/26/2001	06/26/2002
141A	Graphics Plotter	Hewlett Packard	N/A	7470A	03/05/2001	03/05/2002
206B	6.0 dB Attenuator	Texscan	0 - 1.0 GHz	FP-50 - 6 dB	06/26/2001	06/26/2002
523	Biconilog	Electro-Mechanics	26 - 2000 MHz	3142B	06/08/2000	08/08/2001
543	Preamplifier	Hewlett Packard	1.0 GHz - 26.5 GHz	8449B	06/27/2001	06/27/2002
544	EMC Analyzer	Hewlett Packard	9.0 kHz - 1.8 GHz	8591EM	12/14/2000	12/14/2001
617	Interference Analyzer	Electro-Metrics	10 kHz - 1 GHz	EMC-30	02/27/2001	02/27/2002
R105	Spectrum Analyzer	Agilent	9 kHz - 26.5 GHz	E4407B	02/17/2001	02/17/2002

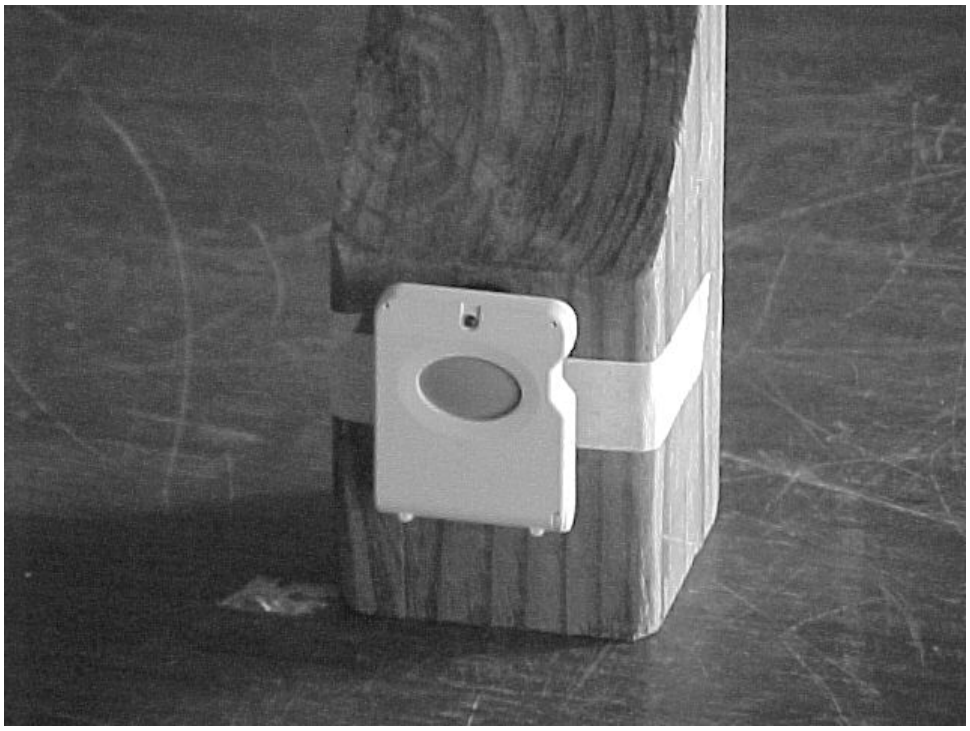
FCC 15.231
RADIATED EMISSIONS, FUNDAMENTAL & SPURIOUS CASE
Please refer to separate electronic file named Refundharm.pdf and Respur.pdf

FCC 15.231(c)

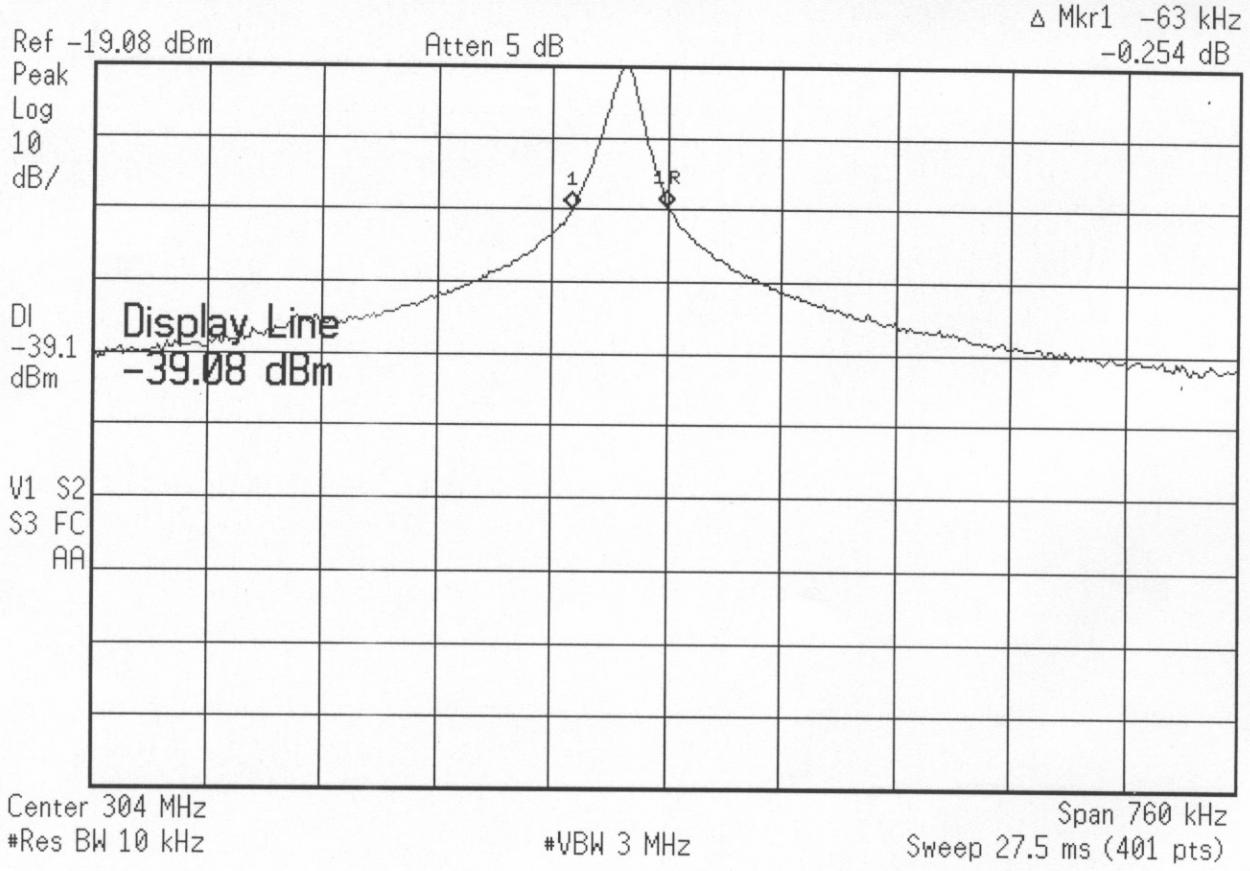
OCCUPIED BANDWIDTH

Please refer to separate electronic file named Occbw.pdf

TEST SETUP PHOTOGRAPH



Agilent 15:39:58 Jul 13, 2001



Customer:	Detection Systems
Test Sample:	304 MHz pulsed RF Transmitter
Model No.:	SEFD1 FCC ID: ESV-0117-06
Test Method:	Occupied Bandwidth
Notes:	Bandwidth does not exceed 0.25% of center frequency (760 kHz) at the 20 dB down points

Date: July 13, 2001 Tech: T. Schneider Sheet 1 of 1

Retlif Testing Laboratories

Report No. R-9089-3

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	Detection Systems	**Job No.**	R-9089-1
Test Sample:	304MHz Transmitter	**Paragraph:**	15.231
Model No.:	SE88	**FCC ID:**	ESV-0117-05
Operating Mode:	Continuously Transmitting a 304MHz Signal		
Technician:	Peter Lananna	**Date:**	July 17, 2001

Notes: Test Distance: 3 Meters
Detector: Peak, Unless otherwise specified

Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)/Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
304	H / 2.0	X	80.6	-4.2	76.4	6606.9	55800
|	H / 1.0	Y	84.3	-4.2	80.1	10115.8	|
|	H / 2.0	Z	80.3	-4.2	76.1	6382.6	|
|	V / 1.8	X	84.7	-4.2	80.5	10592.5	|
|	V / 1.0	Y	70.8	-4.2	66.6	2138.0	|
304	V / 2.0	Z	83.4	-4.2	79.2	9120.1	55800
608	H / 1.0	X	39.0	3.4	42.4	131.8QP	200QP
|	H / 1.3	Y	39.0	3.4	42.4	131.8QP	|
|	H / 2.0	Z	36.0	3.4	39.4	93.3QP	|
|	V / 1.0	X	37.2	3.4	40.6	107.2QP	|
|	V / 1.8	Y	35.0	3.4	38.4	83.2QP	|
608	V / 1.0	Z	40.0	3.4	43.4	147.9QP	200QP
912	H / 1.0	X	22.6	8.4	31.0	35.5*	5580
|	H / 1.0	Y	22.6	8.4	31.0	35.5*	|
|	H / 1.0	Z	39.2	8.4	47.6	239.9	|
|	V / 1.0	X	41.4	8.4	49.8	309.0	|
|	V / 1.0	Y	22.6	8.4	31.0	35.5*	|
912	V / 1.0	Z	42.7	8.4	51.1	358.9	5580
1216	H / 2.3	X	50.1	-3.2	46.9	221.3	5000
|	H / 2.0	Y	49.3	-3.2	46.1	201.8	|
|	H / 1.0	Z	47.7	-3.2	44.5	167.9	|
|	V / 1.3	X	52.4	-3.2	49.2	288.4	|
|	V / 1.8	Y	50.0	-3.2	46.8	218.8	|
1216	V /1.8	Z	49.4	-3.2	46.2	204.2	5000
1520	H / 1.0	X	39.6	-0.3	39.3	92.3*	5000
|	H / 1.0	Y	39.6	-0.3	39.3	92.3*	|
|	H / 1.0	Z	39.6	-0.3	39.3	92.3*	|
|	V / 1.0	X	39.6	-0.3	39.3	92.3*	|
|	V / 1.0	Y	39.6	-0.3	39.3	92.3*	|
1520	V / 1.0	Z	39.6	-0.3	39.3	92.3*	5000
	The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*=Noise Floor Measurements (Minimum system sensitivity)						

Retlif Testing Laboratories

Retlif Job Number R-9089-1

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	Detection Systems	**Job No.**	R-9089-1
Test Sample:	304MHz Transmitter	**Paragraph:**	15.231
Model No.:	SE88	**FCC ID:**	ESV-0117-05
Operating Mode:	Continuously Transmitting a 304MHz Signal		
Technician:	Peter Lananna	**Date:**	July 17, 2001

Notes: Test Distance: 3 Meters

Detector: Peak, unless otherwise specified

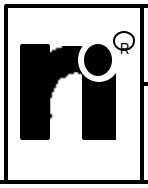
Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
1824	H / 1.0	X	39.9	3.0	42.9	139.6*	5580
|	H / 1.0	Y	39.9	3.0	42.9	139.6*	|
|	H / 1.0	Z	39.9	3.0	42.9	139.6*	|
|	V / 1.0	X	39.9	3.0	42.9	139.6*	|
|	V / 1.0	Y	39.9	3.0	42.9	139.6*	|
1824	V / 1.0	Z	39.9	3.0	42.9	139.6*	5580
2128	H / 1.0	X	36.4	0.4	36.8	69.2*	5580
|	H / 1.0	Y	36.4	0.4	36.8	69.2*	|
|	H / 1.0	Z	36.4	0.4	36.8	69.2*	|
|	V / 1.0	X	36.4	0.4	36.8	69.2*	|
|	V / 1.0	Y	36.4	0.4	36.8	69.2*	|
2128	V / 1.0	Z	36.4	0.4	36.8	69.2*	5580
2432	H / 1.0	X	35.2	3.8	39.0	89.1*	5580
|	H / 1.0	Y	35.2	3.8	39.0	89.1*	|
|	H / 1.0	Z	35.2	3.8	39.0	89.1*	|
|	V / 1.0	X	35.2	3.8	39.0	89.1*	|
|	V / 1.0	Y	35.2	3.8	39.0	89.1*	|
2432	V / 1.0	Z	35.2	3.8	39.0	89.1*	5580
2736	H / 1.0	X	34.4	7.1	41.5	118.9*	5000
|	H / 1.0	Y	34.4	7.1	41.5	118.9*	|
|	H / 1.0	Z	34.4	7.1	41.5	118.9*	|
|	V / 1.0	X	34.4	7.1	41.5	118.9*	|
|	V / 1.0	Y	34.4	7.1	41.5	118.9*	|
2736	V / 1.0	Z	34.4	7.1	41.5	118.9*	5000
3040	H / 1.0	X	39.6	6.4	46.0	199.5*	5580
|	H / 1.0	Y	39.6	6.4	46.0	199.5*	|
|	H / 1.0	Z	39.6	6.4	46.0	199.5*	|
|	V / 1.0	X	39.6	6.4	46.0	199.5*	|
|	V / 1.0	Y	39.6	6.4	46.0	199.5*	|
3040	V / 1.0	Z	39.6	6.4	46.0	199.5*	5580
	The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*=Noise Floor Measurements (Minimum system sensitivity)						

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	Detection Systems	**Job No.**	R-9089-1
Test Sample:	304MHz Transmitter	**Paragraph:**	15.231
Model No.:	SE88	**FCC ID:**	ESV-0117-05
Operating Mode:	Continuously Transmitting a 304MHz Signal		
Technician:	Peter Lananna	**Date:**	July 17, 2001

Notes: Test Distance: 3 Meters — Duty Cycle: 7.6%

Detector: Peak, unless otherwise specified — Duty Cycle Correction: - 22.4 dB

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Correction Factor	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
304	H / 2.0	X	76.4	-22.4	54.0	501.2	5580
|	H / 1.0	Y	80.1	-22.4	57.7	767.4	|
|	H / 2.0	Z	76.1	-22.4	53.7	484.2	|
|	V / 1.8	X	80.5	-22.4	58.1	803.5	|
|	V / 1.0	Y	66.6	-22.4	44.2	162.2	|
304	V / 2.0	Z	79.2	-22.4	56.8	691.8	5580
608	H / 1.0	X	42.4	N/A	42.4	131.8QP	200QP
|	H / 1.3	Y	42.4	N/A	42.4	131.8QP	|
|	H / 2.0	Z	39.4	N/A	39.4	93.3QP	|
|	V / 1.0	X	40.6	N/A	40.6	107.2QP	|
|	V / 1.8	Y	38.4	N/A	38.4	83.2QP	|
608	V / 1.0	Z	43.4	N/A	43.4	147.9QP	200QP
912	H / 1.0	X	31.0	-22.4	8.6	2.7*	558
|	H / 1.0	Y	31.0	-22.4	8.6	2.7*	|
|	H / 1.0	Z	47.6	-22.4	25.2	18.2	|
|	V / 1.0	X	49.8	-22.4	27.4	23.4	|
|	V / 1.0	Y	31.0	-22.4	8.6	2.7*	|
912	V / 1.0	Z	51.1	-22.4	28.7	27.2	558
1216	H / 2.3	X	46.9	-22.4	24.5	16.8	500
|	H / 2.0	Y	46.1	-22.4	23.7	15.3	|
|	H / 1.0	Z	44.5	-22.4	22.1	12.7	|
|	V / 1.3	X	49.2	-22.4	26.8	21.9	|
|	V / 1.8	Y	46.8	-22.4	24.4	16.6	|
1216	V /1.8	Z	46.2	-22.4	23.8	15.5	500
1520	H / 1.0	X	39.3	-22.4	16.9	7.0*	500
|	H / 1.0	Y	39.3	-22.4	16.9	7.0*	|
|	H / 1.0	Z	39.3	-22.4	16.9	7.0*	|
|	V / 1.0	X	39.3	-22.4	16.9	7.0*	|
|	V / 1.0	Y	39.3	-22.4	16.9	7.0*	|
1520	V / 1.0	Z	39.3	-22.4	16.9	7.0*	500
	The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits						
	*=Noise Floor Measurements (Minimum system sensitivity)						



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Retlif Job Number R-9089-1

Test Method:	FCC Part 15 Subpart C Radiated Emissions, Fundamental & Harmonic Emissions		
Customer:	Detection Systems	**Job No.**	R-9089-1
Test Sample:	304MHz Transmitter	**Paragraph:**	15.231
Model No.:	SE88	**FCC ID:**	ESV-0117-05
Operating Mode:	Continuously Transmitting a 304MHz Signal		
Technician:	Peter Lananna	**Date:**	July 17, 2001

Notes: Test Distance: 3 Meters — Duty Cycle: 7.6%

Detector: Peak, unless otherwise specified — Duty Cycle Correction: - 22.4 dB

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Correction Factor	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBuV	dB	dBuV/m	uV/m	uV/m
1824	H / 1.0	X	42.9	-22.4	20.5	10.6*	558
|	H / 1.0	Y	42.9	-22.4	20.5	10.6*	|
|	H / 1.0	Z	42.9	-22.4	20.5	10.6*	|
|	V / 1.0	X	42.9	-22.4	20.5	10.6*	|
|	V / 1.0	Y	42.9	-22.4	20.5	10.6*	|
1824	V / 1.0	Z	42.9	-22.4	20.5	10.6*	558
2128	H / 1.0	X	36.8	-22.4	14.4	5.2*	558
|	H / 1.0	Y	36.8	-22.4	14.4	5.2*	|
|	H / 1.0	Z	36.8	-22.4	14.4	5.2*	|
|	V / 1.0	X	36.8	-22.4	14.4	5.2*	|
|	V / 1.0	Y	36.8	-22.4	14.4	5.2*	|
2128	V / 1.0	Z	36.8	-22.4	14.4	5.2*	558
2432	H / 1.0	X	39.0	-22.4	16.6	6.8*	558
|	H / 1.0	Y	39.0	-22.4	16.6	6.8*	|
|	H / 1.0	Z	39.0	-22.4	16.6	6.8*	|
|	V / 1.0	X	39.0	-22.4	16.6	6.8*	|
|	V / 1.0	Y	39.0	-22.4	16.6	6.8*	|
2432	V / 1.0	Z	39.0	-22.4	16.6	6.8*	558
2736	H / 1.0	X	41.5	-22.4	19.1	9.0*	500
|	H / 1.0	Y	41.5	-22.4	19.1	9.0*	|
|	H / 1.0	Z	41.5	-22.4	19.1	9.0*	|
|	V / 1.0	X	41.5	-22.4	19.1	9.0*	|
|	V / 1.0	Y	41.5	-22.4	19.1	9.0*	|
2736	V / 1.0	Z	41.5	-22.4	19.1	9.0*	500
3040	H / 1.0	X	46.0	-22.4	23.6	15.1*	558
|	H / 1.0	Y	46.0	-22.4	23.6	15.1*	|
|	H / 1.0	Z	46.0	-22.4	23.6	15.1*	|
|	V / 1.0	X	46.0	-22.4	23.6	15.1*	|
|	V / 1.0	Y	46.0	-22.4	23.6	15.1*	|
3040	V / 1.0	Z	46.0	-22.4	23.6	15.1*	558
	The frequency range was scanned from 30 MHz to 3.1 GHz. All emissions not recorded were more						
	Than 10 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.						
	*=Noise Floor Measurements (Minimum system sensitivity)						

Test Method:	FCC Part 15 Subpart C, Spurious Case Radiated Emissions, Paragraph 15.209(a)		
Customer:	Detection Systems, Inc.	**Job No.**	R-9089-1
Test Sample:	304MHz Transmitter		
Model No.:	SE88	**Serial No.**	N/A
Operating Mode:	Continuously transmitting a signal at 304MHz.		
Technician:	Peter Lananna	**Date:**	July 17, 2001

Notes: Test Distance: 3 Meters Temp:28C Humidity:41%
Detector: Quasi-Peak Below 30 MHz to 1 GHz, Peak above 1 GHz

Test Freq.	Antenna Position	EUT Orientation	Meter Readings	Correction Factor	Corrected Reading	Converted Reading	**LIMIT**
MHz	(V/H) / Meters	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
|							|
|							|
|							|
|							|
|							|
|							|
88.00							100
88.00							150
|							|
|							|

No emissions observed at specified test distance.

|							|
|							|
|							|
|							|
216.00							150
216.00							200
|							|
|							|
|							|
960.00							200
960.00							500
|							|
|							|
|							|
3100.0							500

The EUT was scanned from 30 MHz to 3.1 GHz

The emissions observed from the EUT do not exceed the specified limits. Emissions not recorded were more than 10dB under the specified limit

Retlif Testing Laboratories

Retlif Job Number R-9089-1