APPLICATION SUBMITTAL

FOR

FCC GRANT OF CERTIFICATION

Per CFR47 Part 87

FOR

MODEL: 435HPDME

960.0-1215.0 MHz

DISTANCE MEASURING EQUIPMENT

FCC ID: BOJ435

FOR

Thales ATM, Inc.

23501 West 84th Street
Shawnee, KS 66227

Test Report Number 070911

Authorized Signatory: Scot D Rogers

Scot D. Rogers

NVLAP Lab Code 200087-0

Rogers Labs, Inc.
4405 West 259th Terrace
Louisburg, KS 66053
Phone / Fax (913) 837-3214

TEST REPORT

For

APPLICATION of CERTIFICATION

For

THALES ATM, INC.

23501 West 84th Street
SHAWNEE, KS 66227

DISTANCE MEASURING EQUIPMENT
Model: 435HPDME
Frequency Range: 960.0-1215.0 MHz

FCC ID: BOJ435

Test Date: September 11, 2007

Certifying Engineer: Scot D Rogers

Scot D. Rogers
ROGERS LABS, INC.
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FORWARD

In accordance with the Federal Communications Commission (FCC) Code of Federal Regulations (CFR47), dated October 1, 2006, Part 2 Subpart J, Paragraphs 2.907, 2.911, 2.913, 2.915, 2.925, 2.926, 2.1031 through 2.1057, and Part 87, Subchapter D, Paragraphs 87.131 through 87.147, and applicable paragraphs of Part 15, the following information is submitted.

Name of Applicant:
Thales ATM, Inc.
23501 West 84th Street
Shawnee, KS 66227
Model: 435HPDME
FCC I.D.: BOJ435
Operating Power: 1000 W (Peak Antenna Conducted).

Opinion / Interpretation of Results

TESTS PERFORMED	RESULTS
Emissions Tests	
General Radiated Emissions as per CFR47 paragraphs 2 and 87	Complies

Applicable Standards & Test Procedures

In accordance with the Code of Federal Regulations, CFR47 dated October 1, 2006, Part 2 Subpart J, Paragraphs 2.907, 2.911, 2.925, 2.926, 2.1031 through 2.1057 and; Part 87 Subpart H; Paragraphs 87.131 through 87.147 the following report is submitted. Test procedures used are the established Methods of Measurement of Radio-Noise Emissions as described in the ANSI 63.4-2003 and/or TIA/EIA 603-1.

Environmental Conditions

Ambient Temperature	22.2° C
Relative Humidity	58%
Atmospheric Pressure	29.95 in Hg

List of Test Equipment

A Hewlett Packard 8591EM and or 8562A Spectrum Analyzer was used as the measuring device for the emissions testing. The analyzer settings used are described in the following table. Refer to the Appendix for a complete list of Test Equipment.

HP 8591EM SPECTRUM ANALYZER SETTINGS		
CONDUCTED EMISSIONS:		
RBW	AVG. BW	DETECTOR FUNCTION
9 kHz	30 kHz	Peak/Quasi Peak
RADIATED EMISSIONS (30 – 1000 MHz)		
RBW	AVG. BW	DETECTOR FUNCTION
120 kHz	300 kHz	Peak/Quasi Peak
HP 8562A SPECTRUM ANALYZER SETTINGS		
RADIATED EMISSIONS (1 – 40 GHz)		
RBW	AVG. BW	DETECTOR FUNCTION
1 MHz	1 MHz	Peak/Average
ANTENNA CONDUCTED EMISSIONS		
RBW	AVG. BW	DETECTOR FUNCTION
300 Hz -120 kHz	100 kHz	Peak

2.1033(C) Application for Certification

(1) The full name and mailing address of the manufacturer of the device and the applicant for certification.

Thales ATM, Inc.
23501 West 84th Street
Shawnee, KS 66227

(2) FCC identifier BOJ435

(3) A copy of the installation and operating instructions to be furnished the user. Refer to the instruction manual furnished with this application for details.

(4) Type or types of emission 700KM1A

(5) Frequency range of operation 960.0 - 1215.0 MHz.

(6) Range of operating power values or specific operating power levels, and description of any means provided for variation of operating power. The output power is factory set to 1000 W (nominal). The EUT power may be adjusted using the tuning procedure in section 5.3.5 by adjusting a number in the power calibration table. Once the output is adjusted for 1000 watts, peak output power the installation may decrease the power by 3 dB in 1 dB steps. The final amplification stages are hardware limited by the four 325 watt power transistors configured in parallel.

(7) Maximum power rating as defined in the applicable part(s) of the rules. As stated in CFR47, 87.131, the maximum permissible output power allowed varies as determined by appropriate Government agencies.

(8) The dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range. The 435HPDME transmitter amplification stage runs at 54 volts with 3.3 Amps current for a power requirement of 178.2 Watts. The equipment transmits pulse pairs at a maximum rate of 9600 pulses per second using a pulse width of 3.5 microseconds, operating at a maximum duty cycle of 3.5%.

(9) Tune-up procedure over the power range, or at specific operating power levels. Refer to the tune-up procedure furnished with this application for details.

(10) A schematic diagram and a description of all circuitry and devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation, and for limiting power. Refer to the schematics furnished with this application for details.

(11) A photograph or drawing of the equipment identification plate or label showing the information to be placed thereon. Refer to the FCC identification label information furnished with this application for details.

(12) Photographs (8" x 10") of the equipment of sufficient clarity to reveal equipment construction and layout, including meters, if any, and labels for controls and meters and sufficient views of the internal construction to define component placement and chassis assembly. Insofar as these requirements are met by photographs or drawings contained in instruction manuals supplied with the certification request, additional photographs are necessary only to complete the required showing. Refer to the exhibits of this report and or additional information furnished with the application for details.

(13) For equipment employing digital modulation techniques, a detailed description of the modulation system to be used, including the response characteristics (frequency, phase, and amplitude) of any filters provided, and a description of the modulating wave train, shall be submitted for the maximum rated conditions under which the equipment will be operated. The unit does not use digital modulation. It uses digital processing go get the audio ready for transmission, and then converts it back to audio before transmission.

(14) The data required by Sections 2.1046 through 2.1057, inclusive, measured in accordance with the procedures set out in Section 2.1041.

(15) The application for certification of an external radio frequency power amplifier under Part 97 of this chapter need not be accompanied by the data required by Paragraph (b)(14) of this section. In lieu thereof, measurements shall be submitted to show compliance with the technical specifications in Subpart C of Part 97 of this chapter and such information as required by Section 2.1060 of this part. This paragraph does not apply to this equipment.

(16) An application for certification of an AM broadcast stereophonic exciter-generator intended for interfacing with existing certified, or formerly type accepted or notified transmitters must include measurements made on a complete stereophonic transmitter. The instruction book must include complete specifications and circuit requirements for interconnecting with existing transmitters. The instruction book must also provide a full description of the equipment and measurement procedures to monitor modulation and to verify that the combination of stereo exciter-generator and transmitter meets the emission limitations of section 73.44. This paragraph does not apply to this equipment.

(17) A single application may be filed for a composite system that incorporates devices subject to certification under multiple rule parts; however, the appropriate fee must be included for each device. Separate applications must be filed if different FCC Identifiers will be used for each device.

2.1046 Radio Frequency Power Output

Measurements Required

Measurements shall be made to establish the radio frequency power delivered by the transmitter into the standard output termination. The power output shall be monitored and recorded and no adjustment shall be made to the transmitter after the test has begun, except as noted below:

If the power output is adjustable, measurements shall be made for the highest and lowest power levels.

Test Arrangement

The radio frequency power output was measured at the antenna terminal by placing 63 dB of attenuation in the antenna line and observing the emission with the spectrum analyzer. The spectrum analyzer had an impedance of 50Ω to match the impedance of the standard antenna. A HP 8562A Spectrum Analyzer was used to measure the radio frequency power at the antenna port. The data was taken in dBm and converted to watts as shown in the following Table. Data was taken per Paragraph 47 CFR, 2.1046(a) and applicable paragraphs of Part 87.

P_{dBm} = power in dB above 1 milliwatt.
Milliwatts = $10^{(PdBm/10)}$
Watts = (Milliwatts)(0.001)(W/mW)

milliwatts = $10^{(60.7/10)}$
Power = 1,174,897.6 mW
Power = 1,174.9 Watts

Antenna Conducted Output Power Data

Frequency MHz	P_{dBm} (Peak)	P_{mw} (Peak)	P_{w} (Peak)
962.0	60.7	1,174,897.6	1,174.9
1024.0	60.4	1,096,478.2	1,096.5
1213.0	60.6	1,148,153.6	1,148.2

The specifications of Paragraph 47 CFR 2.1046(a) and applicable Parts of 2 and 87 are met. There are no deviations to the specifications.

2.1047 Modulation Characteristics

Measurements Required

A curve or equivalent data, which shows that the equipment will meet the modulation requirements of the rules, under which the equipment is to be licensed, shall be submitted.

Modulation Characteristic Results

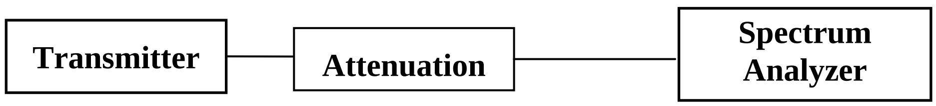
The Federal Aviation Administration, with specifications for pulse width characteristics, rise and fall times, and durations governs the Distance Measuring Equipment modulation. The equipment meets the requirements of the FAA as demonstrated. Therefore, no modulation characteristics were measured or presented for this report. The specifications of 2.987 and applicable paragraphs of Part 87 are met. There are no deviations to the specifications.

2.1049 Occupied Bandwidth

Measurements Required

The occupied bandwidth, that is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are equal to 0.5 percent of the total mean power radiated by a given emission.

Test Arrangement



Occupied Bandwidth Data

A spectrum analyzer was used to observe the radio frequency spectrum with the transmitter operating in a normal mode. The power ratio in dB representing 99.5% of the total mean power was recorded from the spectrum analyzer. Refer to figures 1 through 3 for plots of the 99.5% occupied bandwidth as displayed on the spectrum analyzer.

Frequency (MHz)	Occupied bandwidth(kHz)
962.0	530.0
1024.0	530.0
1213.0	580.0

The requirements of CFR47 2.1049(c)(1) and applicable paragraphs of Part 87 are met. There are no deviations to the specifications.

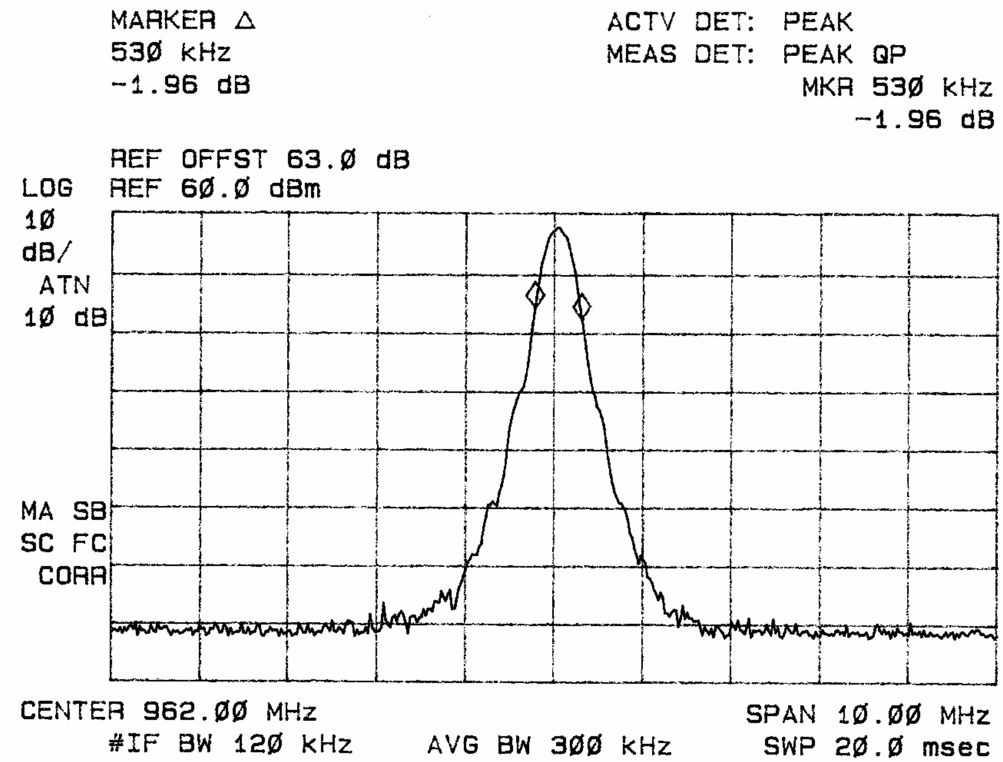


Figure one Occupied Bandwidth Plot (962.0 MHz)

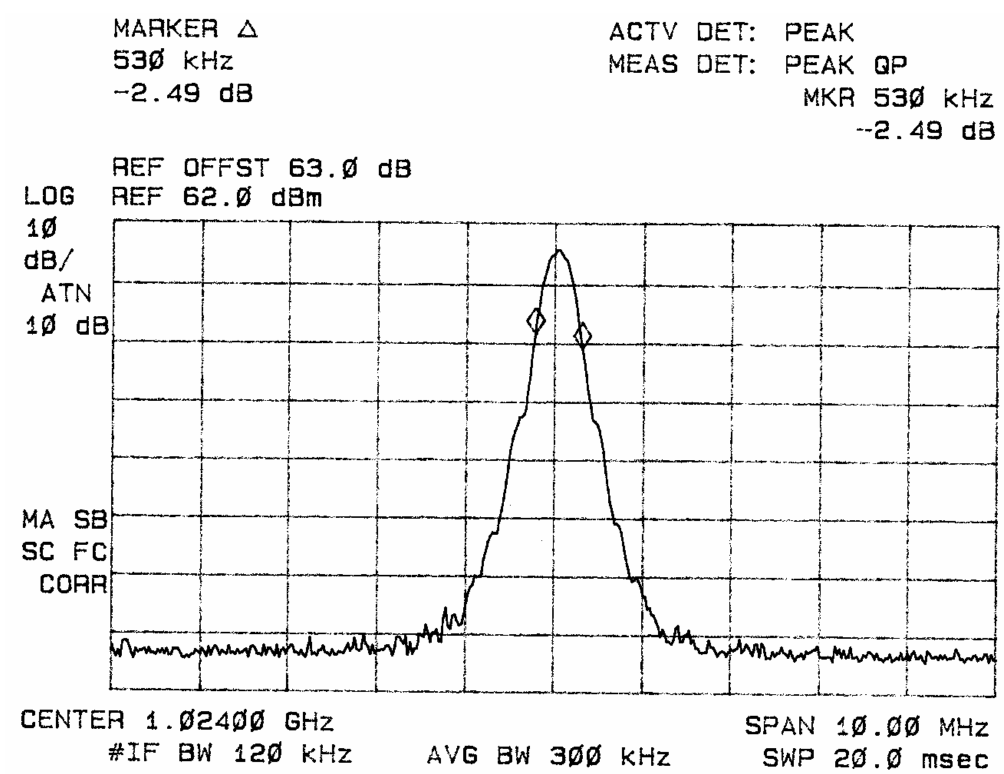


Figure two Occupied Bandwidth Plot (1024.0 MHz)

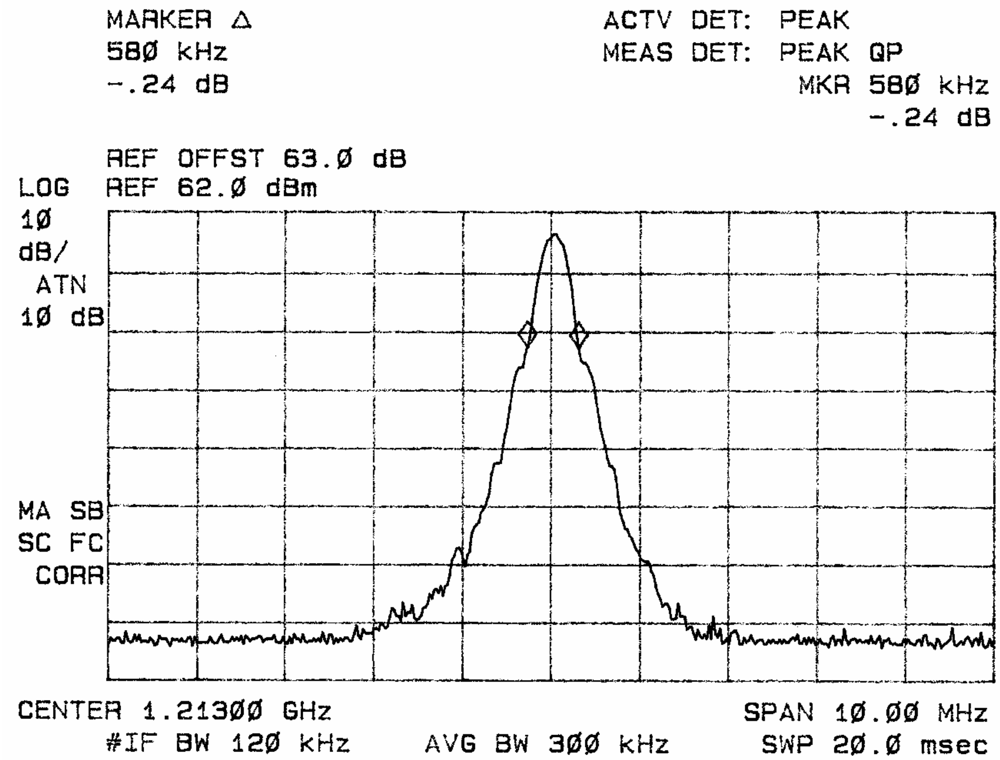


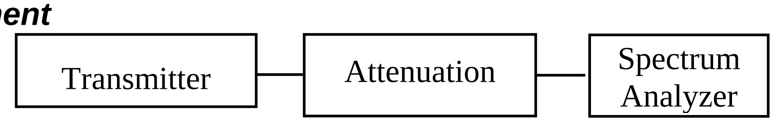
Figure three Occupied Bandwidth Plot (1213.0 MHz)

2.1051 Spurious Emissions at Antenna Terminals

Measurements Required

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna.

Test Arrangement



The radio frequency output was coupled to a HP 8562A Spectrum Analyzer. The spectrum analyzer was used to observe the radio frequency spectrum with the transmitter modulated per section 2.1049 and operated in a normal mode. The frequency spectrum from 30 MHz to 18,000 MHz was observed and plots produced of the frequency spectrum. Refer to figures 4 through 7 represents data for the spurious emissions of the 435HPDME. Figures 5 through 7 were taken using a notch filter to attenuate the fundamental frequency. Data was taken per CFR47 2.1051, 2.1057, and applicable paragraphs of Part 87.

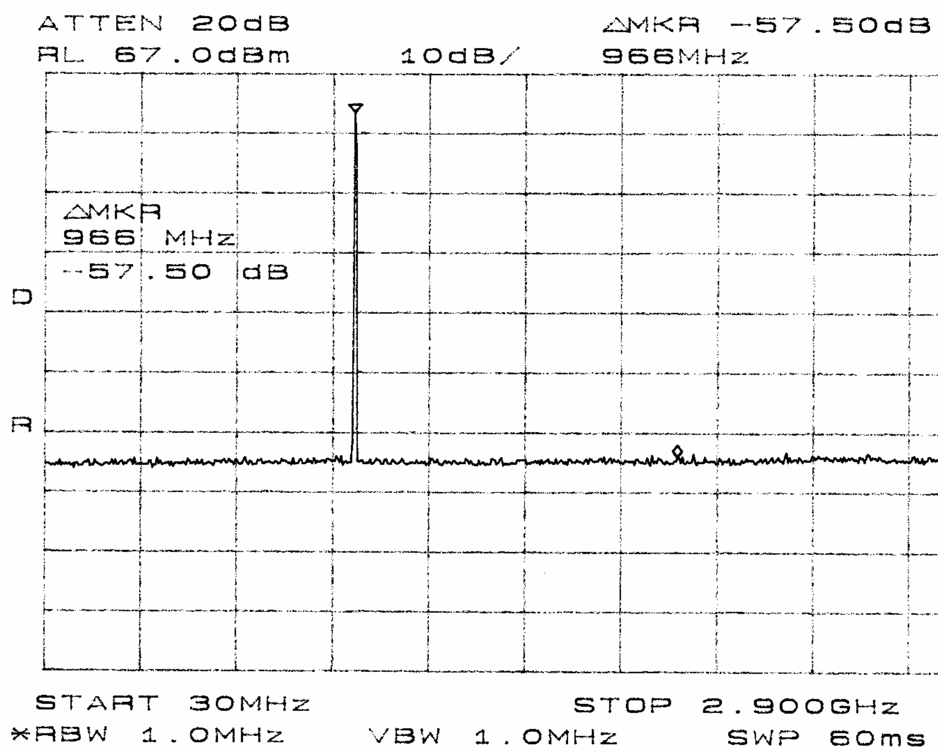


Figure four Spurious Emissions at Antenna Terminal.

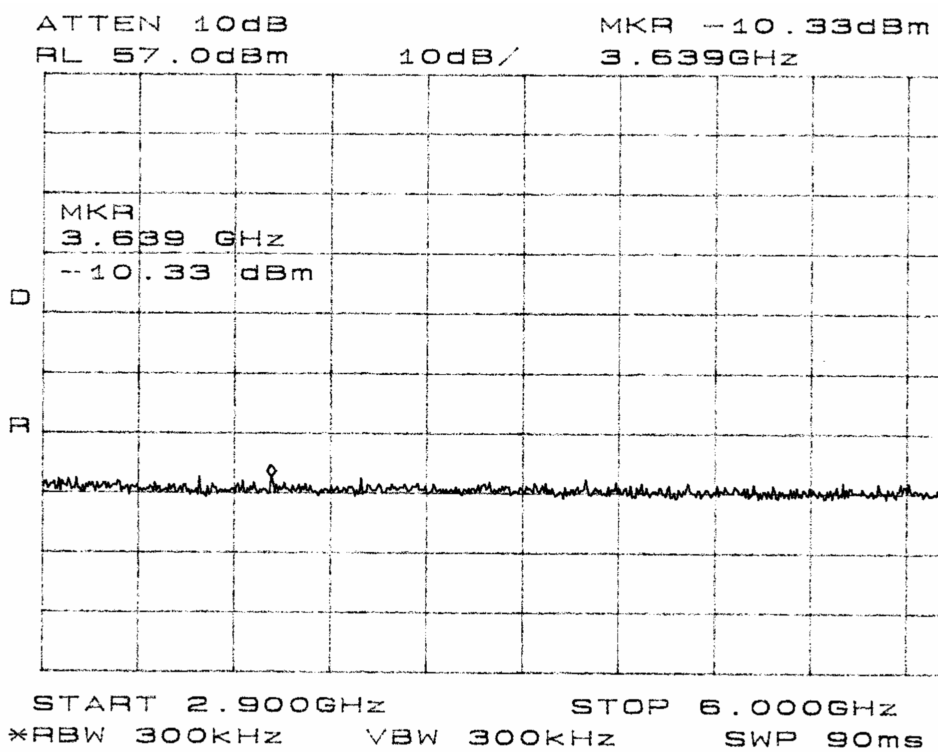


Figure five Spurious Emissions at Antenna Terminal.

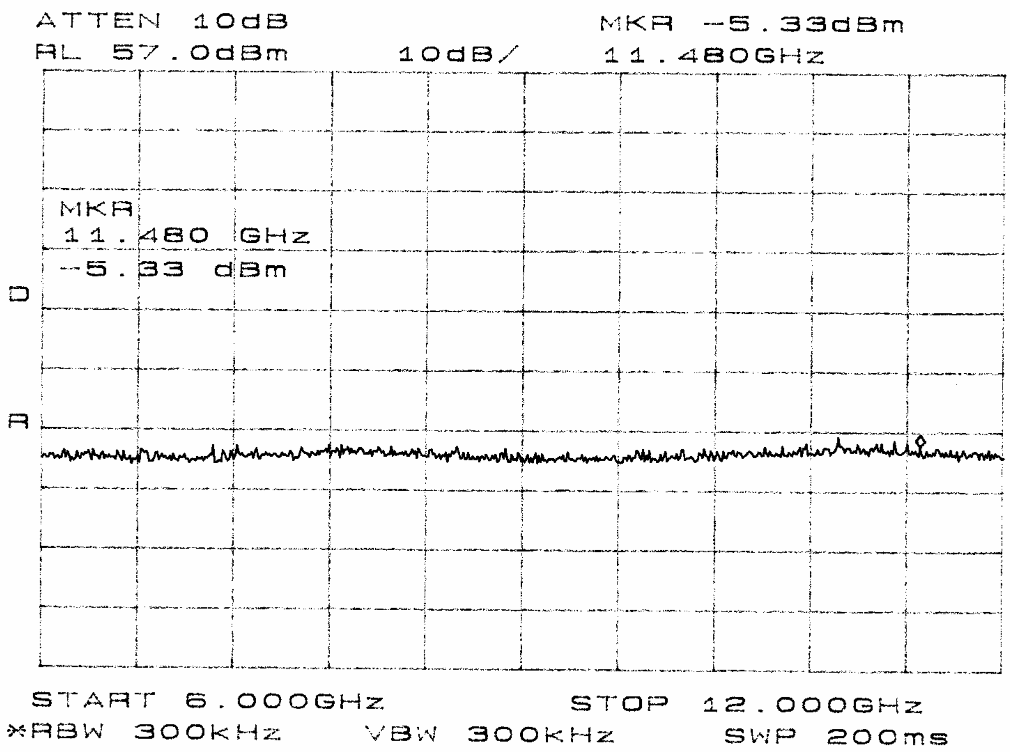


Figure six Spurious Emissions at Antenna Terminal.

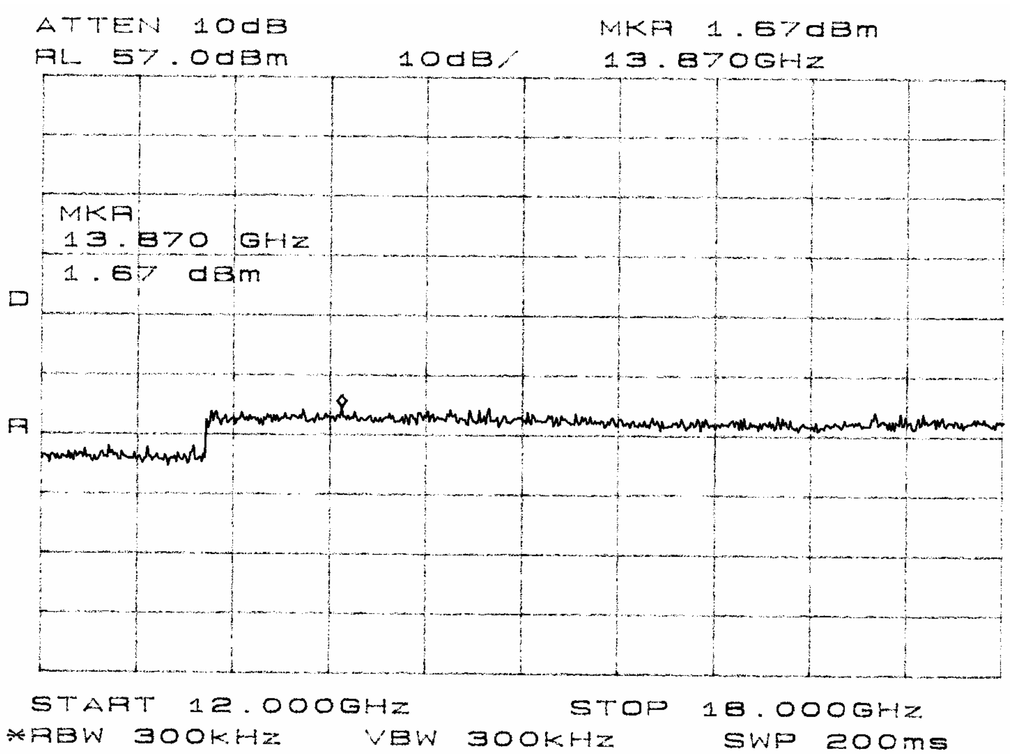


Figure seven Spurious Emissions at Antenna Terminal.

Antenna Conducted Spurious Emissions Requirements

The output of the unit was coupled to a HP Spectrum Analyzer and the frequency emissions were measured. Data was taken as per CFR47 2.1051 and applicable paragraphs of Part 87. Specifications of Paragraphs CFR47 2.1051, 2.1057 and applicable paragraphs of part 87 are met. There are no deviations to the specifications.

FCC Limit: The spurious emissions must be reduced in power by at least 43 + 10 LOG(P_o) below the carrier output power.

1000 Watt = 43 + 10 LOG(P_o)

= 43 + 10 LOG(1000)

Limit = 73.00 dB below carrier

Limit = 60.00 – 73.00 dBm (calculated absolute limit -13dBm)

Antenna Conducted Spurious Emissions Data

Channel MHz	Spurious Freq. (MHz)	Measured Level (dBm)	Level Below Carrier (dB)
962.0	1924.0	-14.2	74.9
	2886.0	-14.0	74.7
	3848.0	-14.0	74.7
	4810.0	-14.5	75.2
	5772.0	-15.3	76.0
	6734.0	-23.1	83.8
	7696.0	-24.5	85.2
	8658.0	-25.1	85.8
	9620.0	-22.1	82.8
1024.0	2048.0	-14.3	74.7
	3072.0	-13.8	74.2
	4096.0	-13.7	74.1
	5120.0	-14.3	74.7
	6144.0	-14.2	74.6
	7168.0	-22.2	82.6
	8192.0	-23.7	84.1
	9216.0	-24.5	84.9
	10240.0	-21.5	81.9
1213.0	2426.0	-14.0	74.6
	3639.0	-14.3	74.9
	4852.0	-13.8	74.4
	6065.0	-14.3	74.9
	7278.0	-13.8	74.4
	8491.0	-24.5	85.1
	9704.0	-23.3	83.9
	10917.0	-25.6	86.2
	12130.0	-24.6	85.2

2.1053 Field Strength of Spurious Radiation

Measurements Required

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation.

Test Arrangement

The transmitter was placed on a wooden turntable 0.1 meters above the ground plane at a distance of 3 meters from the Field Strength Measuring (FSM) antenna. With the EUT modulated and radiating into a 50Ω load. The receiving antenna was raised and lowered from 1m to 4m to obtain the maximum reading of spurious radiation from the EUT on the spectrum analyzer. The turntable was rotated though 360 degrees to locate the position registering the highest amplitude of emission. The frequency spectrum was then searched for spurious emissions generated from the transmitter. The amplitude of each spurious emission was maximized by raising and lowering the FSM antenna, and rotating the turntable before final data was recorded. A biconilog antenna was used for frequency measurements of 30 to 1000 MHz. A log periodic antenna was used for frequencies of 1000 MHz to 5000 MHz, and/or a double-ridge horn for frequencies of 1 GHz to 18 GHz. Emission levels were measured and recorded from the spectrum analyzer in dBμV. The transmitter was then removed and replaced with a substitution antenna powered from a signal generator. The output power from the generator was then adjusted such that the amplitude received was the same as that previously recorded for each frequency. This step was repeated for both horizontal and vertical polarizations. The power in dBm required to produce the desired signal level was then recorded from the signal generator. The power in dBm was then calculated by reducing the previous readings by the gain in the substitution antenna. Data was taken at the ROGERS LABS, INC. 3 meters open area test site (OATS). A description of the test facility is on file with the FCC, Reference 90910. The testing procedures used conform to the procedures stated in the TIA/EIA-603 document.

The limits for the spurious radiated emissions are defined by the following equation.

Limit = Amplitude of the spurious emission must be attenuated by this amount below the level of the fundamental. On any frequency removed from the assigned frequency by more than 250% of the authorized bandwidth: at least 43 + 10 Log (P_o) dB.

Spurious limit = $43 + 10\ \mathrm{Log}_{10}(P_w)$

$= 43 + 10\ \mathrm{Log}_{10}(1000)$

= 73.0 dB below the carrier frequency amplitude

Refer to figures eight through thirteen showing plots of the radiated emissions of the EUT taken at 1-meter in the screen room.

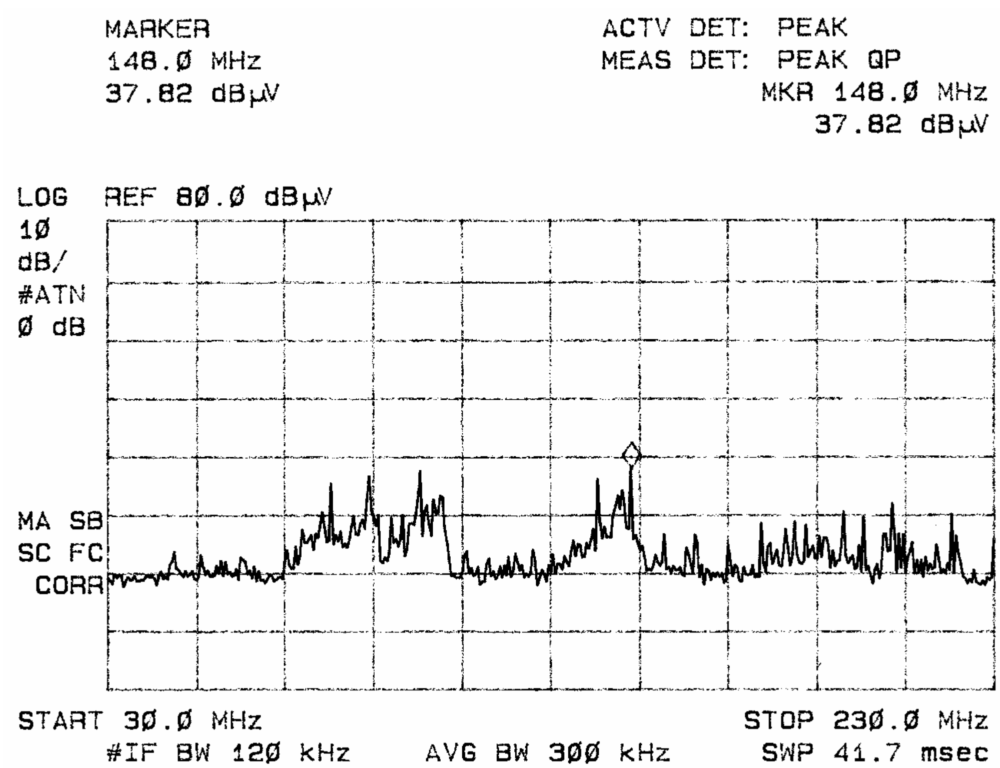


Figure eight radiated emissions taken in screen room

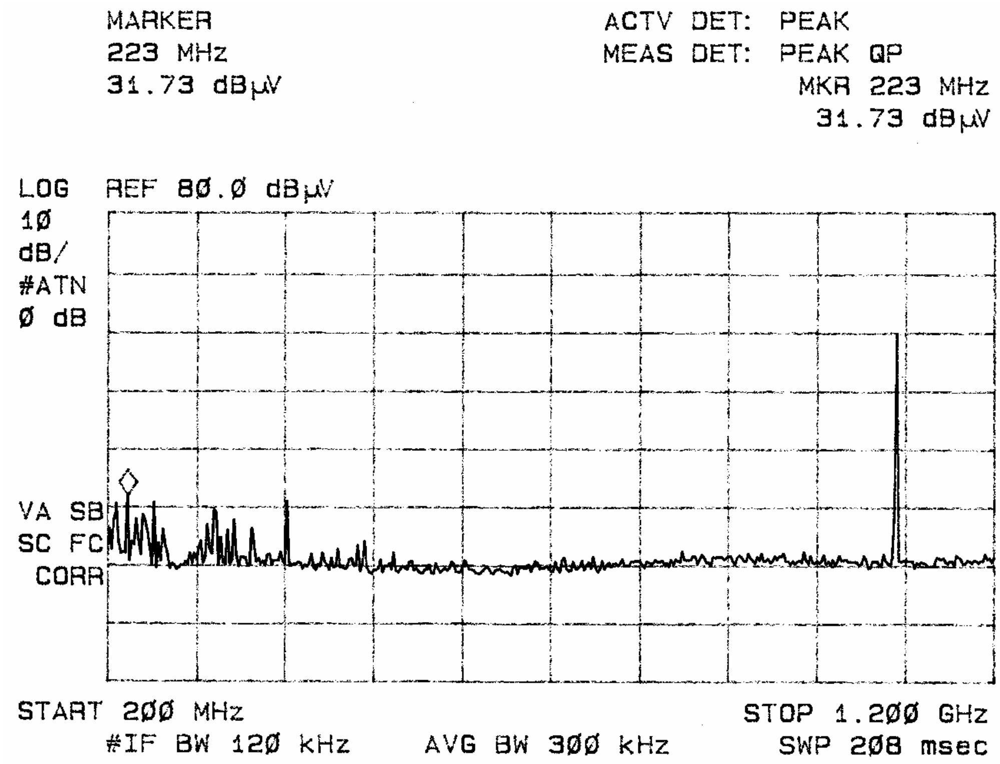


Figure nine radiated emissions taken in screen room

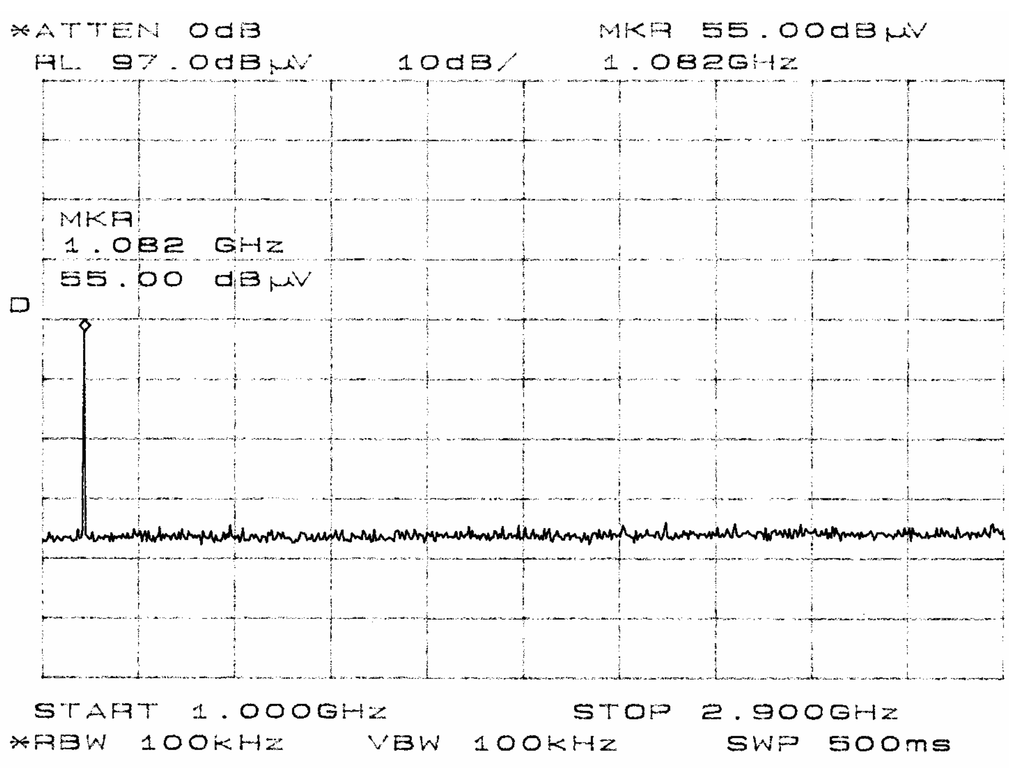


Figure ten radiated emissions taken in screen room

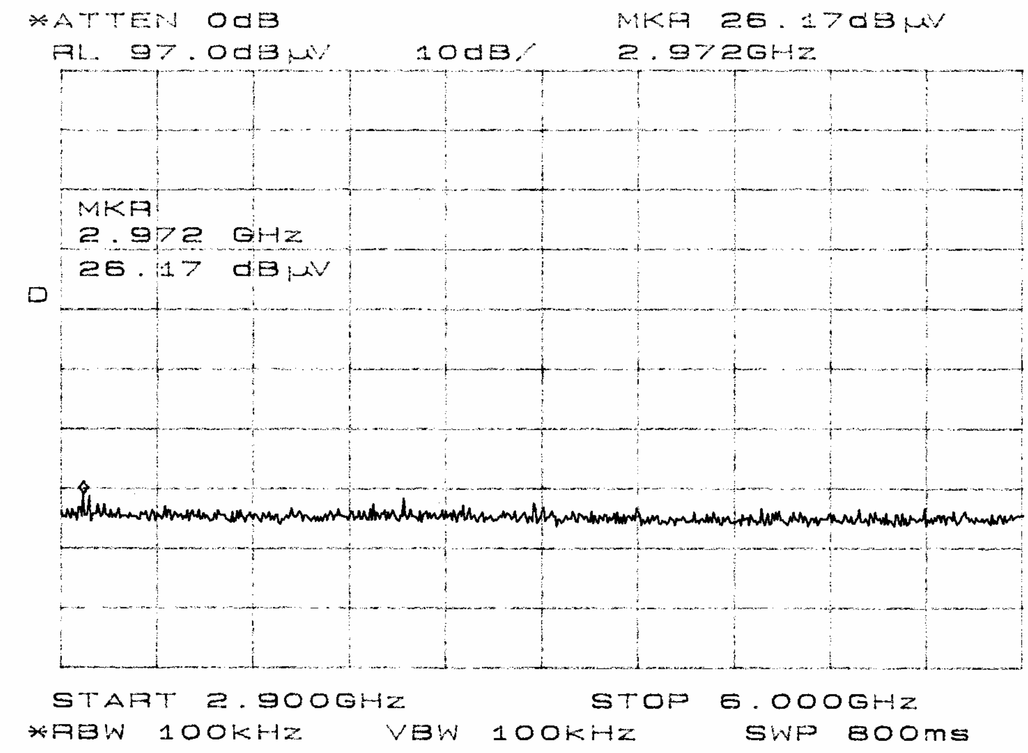


Figure eleven radiated emissions taken in screen room

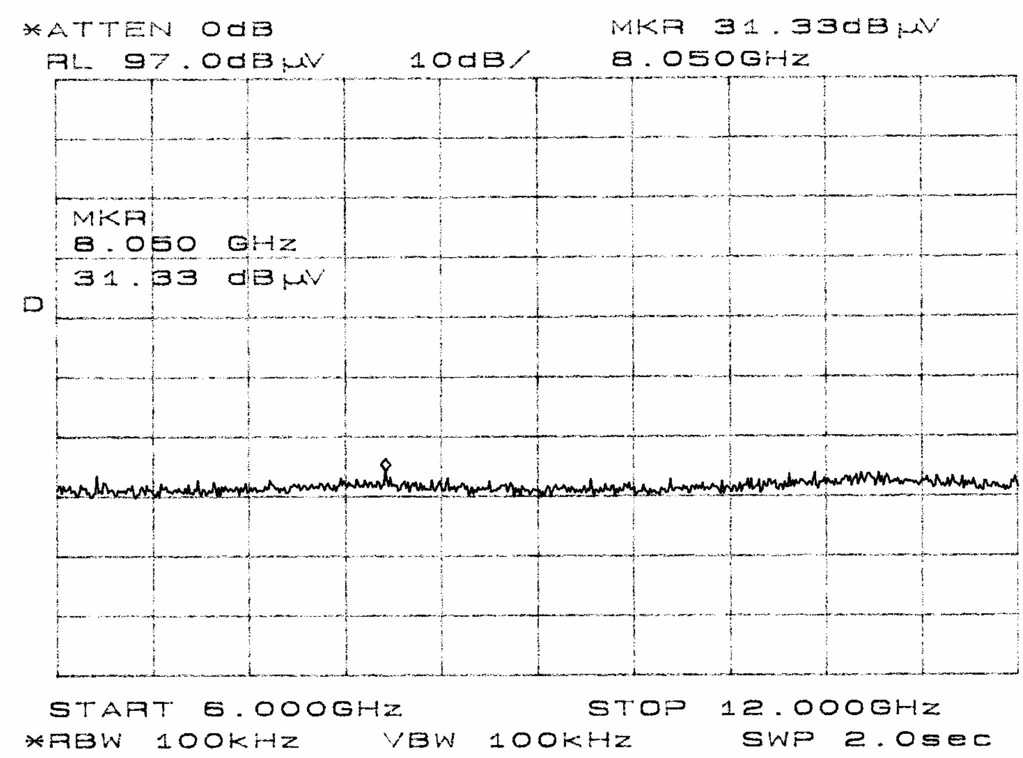


Figure twelve radiated emissions taken in screen room

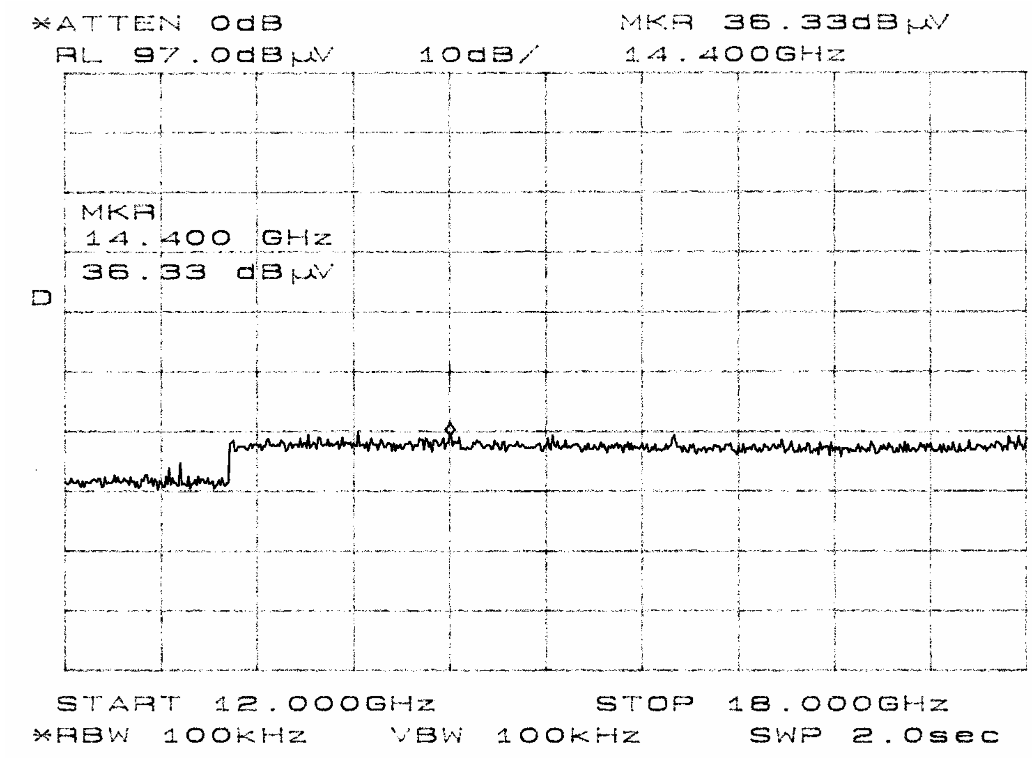


Figure thirteen radiated emissions taken in screen room

Field Strength of Spurious Radiation Requirements

The EUT was connected to a dummy load and set to transmit at the desired frequency. The amplitude of each spurious emission was then maximized and recorded. The transmitter produces 1000 watts of peak output power (60 dBm). Then the radiated spurious emission in dB is calculated from the following equation:

Radiated spurious emission (dB) = RSE
Radiated spurious emission (dB) =
10 Log_{10}[Tx power(W)/0.001] – signal level required to reproduce example:
RSE = 10 Log_{10}[1174.9/0.001]-(-70.23) = 130.9 dBc

Spurious Radiated Emissions Data

Frequency of Emission	Amplitude of Spurious emission		Signal level to dipole required to reproduce		Emission level below carrier		Limit
	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	
(MHz)	dBμV/m	dBμV/m	dBm	dBm	dBc	dBc	dBc
1924.0	25.8	26.1	-70.23	-69.93	130.9	130.6	73.0
2886.0	26.0	28.3	-64.33	-62.03	125.0	122.7	73.0
3848.0	25.3	26.0	-61.33	-60.63	122.0	121.3	73.0
4810.0	26.5	27.8	-58.23	-56.93	118.9	117.6	73.0
5772.0	28.2	28.5	-63.33	-63.03	124.0	123.7	73.0
2048.0	27.1	28.5	-67.83	-66.43	128.2	126.8	73.0
3072.0	26.6	27.0	-63.03	-62.63	123.4	123.0	73.0
4096.0	26.8	28.1	-59.33	-58.03	119.7	118.4	73.0
5120.0	25.3	26.0	-59.73	-59.03	120.1	119.4	73.0
2426.0	27.5	28.0	-64.23	-63.73	124.8	124.3	73.0
3639.0	27.0	27.8	-59.33	-58.53	119.9	119.1	73.0
4852.0	25.5	27.5	-59.63	-57.63	120.2	118.2	73.0
6065.0	25.0	24.5	-56.73	-57.23	117.3	117.8	73.0

General Radiated Emissions Data

Emission Freq. (MHz)	FSM Horz. (dBµV)	FSM Vert. (dBµV)	Ant. Factor (dB)	Amp Gain (dB)	RFS Horz. @ 3m (dBµV/m)	RFS Vert. @ 3m (dBµV/m)	Limit @ 3m (dBµV/m)
73.7	41.8	51.4	7.8	30	19.6	29.2	40.0
77.5	44.4	51.6	7.8	30	22.2	29.4	40.0
80.0	52.0	53.0	8.0	30	30.0	31.0	40.0
100.0	51.9	48.9	7.2	30	29.1	26.1	43.5
105.0	51.9	51.2	7.0	30	28.9	28.2	43.5
140.1	41.5	48.2	9.6	30	21.1	27.8	43.5
144.9	36.6	46.0	12.1	30	18.7	28.1	43.5
147.5	45.0	44.1	12.1	30	27.1	26.2	43.5
195.3	41.0	40.7	10.6	30	21.6	21.3	43.5
206.5	48.9	47.5	10.6	30	29.5	28.1	43.5
242.1	39.2	50.0	11.7	30	20.9	31.7	46.0
250.6	40.3	45.2	12.3	30	22.6	27.5	46.0
340.0	38.1	42.0	15.1	30	23.2	27.1	46.0
400.0	38.5	46.7	16.6	30	25.1	33.3	46.0

Other emissions present presented amplitudes at least 20 dB below limits.

Specifications of CFR47 Paragraph 2.1053, 2.1057, applicable paragraphs of part 87 are met. There are no deviations or exceptions to the specifications.

Statement of Modifications and Deviations

No modifications to the EUT were required for the unit to meet the CFR47 Part 87 requirements. There were no deviations or exceptions to the specifications.

2.1055 Frequency Stability

Measurements Required

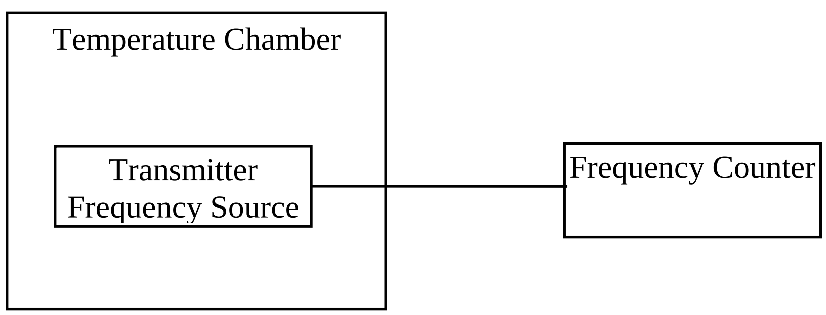
The frequency stability shall be measured with variations of ambient temperature from -30° to +50° centigrade. Measurements shall be made at the extremes of the temperature range and at intervals of not more than 10° centigrade through the range. A period sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. In addition to temperature stability, the frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal.

(2) For hand carried, batteries powered equipment, reduce primary supply voltage to the battery-operating end point, which shall be specified by the manufacturer.

(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

Test Arrangement



The measurement procedure outlined below shall be followed.

Step 1: The transmitter shall be installed in an environmental test chamber whose temperature is controllable. Provision shall be made to measure the frequency of the transmitter.

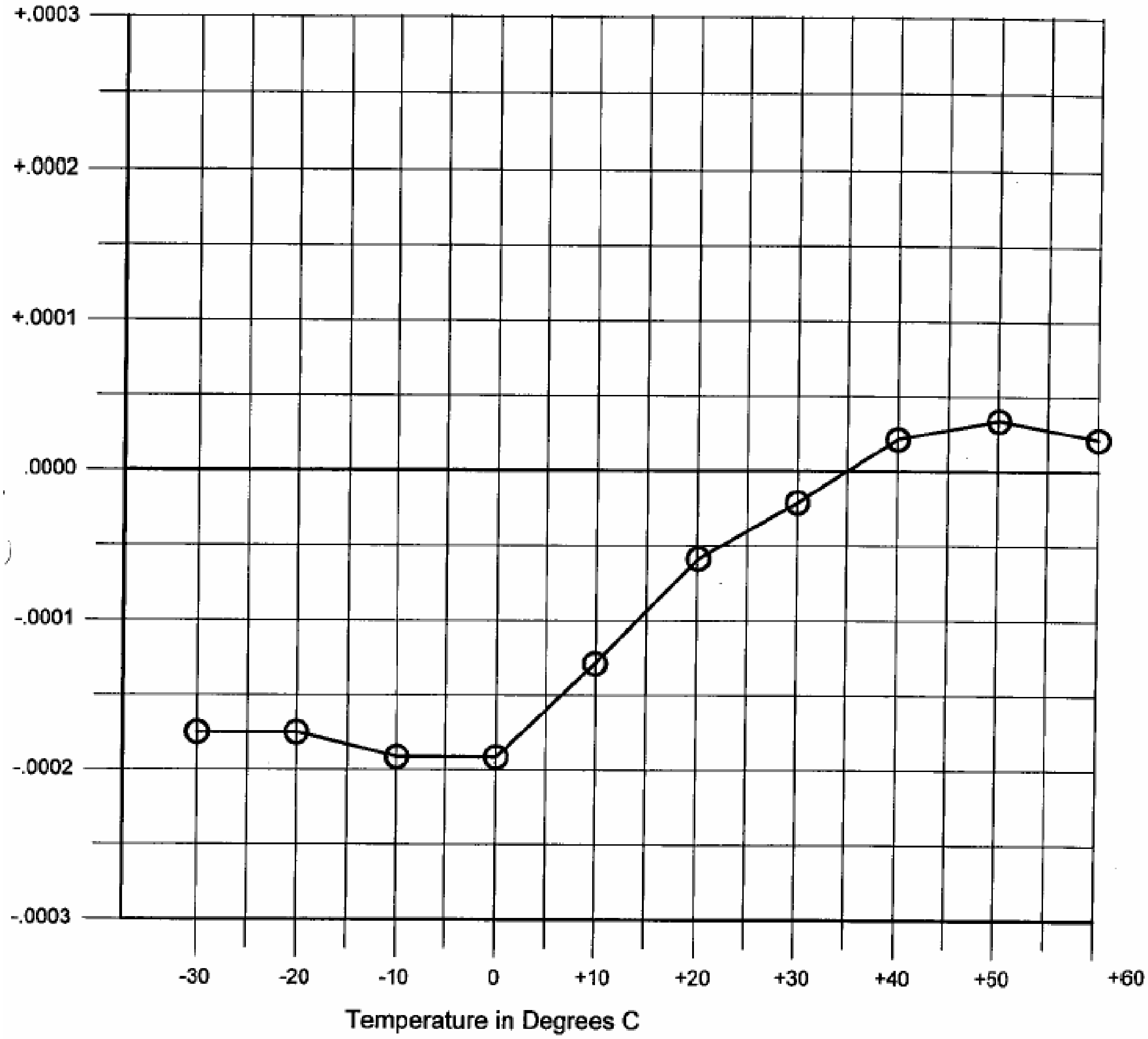
Step 2: With the transmitter inoperative (power switched “OFF”), the temperature of the test chamber shall be adjusted to +25°C. After a temperature stabilization period of one hour at +25°C, the transmitter shall be switched “ON” with standard test voltage applied.

Step 3: The carrier shall be keyed “ON”, and the transmitter shall be operated unmodulated at full radio frequency power output at the duty cycle, for which it is rated, for duration of at least 5 minutes. The radio frequency carrier frequency shall be monitored and measurements shall be recorded.

Step 4: The test procedures outlined in Steps 2 and 3, shall be repeated after stabilizing the transmitter at the environmental temperatures specified, -30°C to +50°C in 10-degree increments.

The frequency stability was measured with variations in the power supply voltage from 85 to 115 percent of the nominal value. An AC Power Source was used to vary the AC voltage for the power input from 102 Vac to 138 Vac. The frequency was measured and the variation in parts per million was calculated. Data was taken per CFR47 Paragraphs 2.1055 and applicable paragraphs of part 87.

Frequency Stability Data



Frequency 1024.00000 MHz	Frequency Stability Vs Voltage Variation 120 volts nominal; Results In Ppm		
Input Voltage	102	120	138
Change (HZ)	0.0	0.0	0.0

Specifications of CFR47 Paragraphs 2.1055 and applicable paragraphs of part 87 are met.
There are no deviations or exceptions to the specifications.

Annex

- Annex A, Measurement Uncertainty Calculations
- Annex B, Test Equipment List.
- Annex C, Rogers Qualifications.
- Annex D, FCC Site Approval Letter.
- Annex E, Industry Canada Approval Letter.

Annex A Measurement Uncertainty Calculations

Radiated Emissions Measurement Uncertainty Calculation

Measurement of vertically polarized radiated field strength over the frequency range 30 MHz to 1 GHz on an open area test site at 3m and 10m includes following uncertainty:

Contribution	Probability Distribution	Uncertainty (dB)
Antenna factor calibration	normal (k = 2)	±0.58
Cable loss calibration	normal (k = 2)	±0.2
Receiver specification	rectangular	±1.0
Antenna directivity	rectangular	±0.1
Antenna factor variation with height	rectangular	±2.0
Antenna factor frequency interpolation	rectangular	±0.1
Measurement distance variation	rectangular	±0.2
Site Imperfections	rectangular	±1.5

Combined standard uncertainty $u_c(y)$ is

$$U_c(y) = \pm \sqrt{\left[\frac{1.0}{2}\right]^2 + \left[\frac{0.2}{2}\right]^2 + \left[\frac{1.0^2 + 0.1^2 + 2.0^2 + 0.1^2 + 0.2^2 + 1.5^2}{3}\right]}$$

$U_c(y) = \pm$ 1.6 dB

It is probable that $u_c(y) / s(q_k) > 3$, where $s(q_k)$ is estimated standard deviation from a sample of n readings

$$s(q_k) = \sqrt{\frac{1}{(n-1)} \sum_{k-1}^{n} (q_k - \bar{q})^2}$$

unless the repeatability of the EUT is particularly poor, and a coverage factor of k = 2 will ensure that the level of confidence will be approximately 95%, therefore:

$$U = 2\, U_c(y) = 2 \text{ x } \pm 1.6 \text{ dB} = \pm 3.2 \text{ dB}$$

Notes:

1.1 Uncertainties for the antenna and cable were estimated, based on a normal probability distribution with k = 2.

1.2 The receiver uncertainty was obtained from the manufacturer's specification for which a rectangular distribution was assumed.

1.3 The antenna factor uncertainty does not take account of antenna directivity.

1.4 The antenna factor varies with height and since the height was not always the same in use as when the antenna was calibrated an additional uncertainty is added.

1.5 The uncertainty in the measurement distance is relatively small but has some effect on the received signal strength. The increase in measurement distance as the antenna height is increased is an inevitable consequence of the test method and is therefore not considered a contribution to uncertainty.

1.6 Site imperfections are difficult to quantify but may include the following contributions:
-Unwanted reflections from adjacent objects.
-Ground plane imperfections: reflection coefficient, flatness, and edge effects.
-Losses or reflections from "transparent" cabins for the EUT or site coverings.
-Earth currents in antenna cable (mainly effect biconical antennas).

The specified limits for the difference between measured site attenuation and the theoretical value (± 4 dB) were not included in total since the measurement of site attenuation includes uncertainty contributions already allowed for in this budget, such as antenna factor.

Conducted Measurements Uncertainty Calculation

Measurement of conducted emissions over the frequency range 9 kHz to 30 MHz includes following uncertainty:

Contribution	Probability Distribution	Uncertainty (dB)
Receiver specification	rectangular	±1.5
LISN coupling specification	rectangular	±1.5
Cable and input attenuator calibration	normal (k=2)	±0.5

Combined standard uncertainty $u_C(y)$ is

$$U_c(y) = \pm \sqrt{\left[\frac{0.5}{2}\right]^2 + \frac{1.5^2 + 1.5^2}{3}}$$

$U_C(y) = \pm 1.2$ dB

As with radiated field strength uncertainty, it is probable that $u_C(y) / s(q_k) > 3$ and a coverage factor of k = 2 will suffice, therefore:

$U = 2\ U_C(y) = 2 \times \pm 1.2$ dB $= \pm 2.4$ dB

Annex B Test Equipment List For Rogers Labs, Inc.

The test equipment used is maintained in calibration and good operating condition. Use of this calibrated equipment ensures measurements are traceable to national standards.

List of Test Equipment	Calibration Date
Oscilloscope Scope: Tektronix 2230	2/07
Wattmeter: Bird 43 with Load Bird 8085	2/07
Power Supplies: Sorensen SRL 20-25, SRL 40-25, DCR 150, DCR 140	2/07
H/V Power Supply: Fluke Model: 408B (SN: 573)	2/07
R.F. Generator: HP 606A	2/07
R.F. Generator: HP 8614A	2/07
R.F. Generator: HP 8640B	2/07
Spectrum Analyzer: HP 8562A,	2/07
Mixers: 11517A, 11970A, 11970K, 11970U, 11970V, 11970W	
HP Adapters: 11518, 11519, 11520	
Spectrum Analyzer: HP 8591EM	5/07
Frequency Counter: Leader LDC825	2/07
Antenna: EMCO Biconilog Model: 3143	5/07
Antenna: EMCO Log Periodic Model: 3147	10/06
Antenna: Antenna Research Biconical Model: BCD 235	10/06
Antenna: EMCO Dipole Set 3121C	2/07
Antenna: C.D. B-101	2/07
Antenna: Solar 9229-1 & 9230-1	2/07
Antenna: EMCO 6509	2/07
Audio Oscillator: H.P. 201CD	2/07
R.F. Power Amp 65W Model: 470-A-1010	2/07
R.F. Power Amp 50W M185- 10-501	2/07
R.F. PreAmp CPPA-102	2/07
LISN 50 µHy/50 ohm/0.1 µf	10/06
LISN Compliance Eng. 240/20	2/07
LISN Fischer Custom Communications FCC-LISN-50-16-2-08	2/07
Peavey Power Amp Model: IPS 801	2/07
Power Amp A.R. Model: 10W 1010M7	2/07
Power Amp EIN Model: A301	2/07
ELGAR Model: 1751	2/07
ELGAR Model: TG 704A-3D	2/07
ESD Test Set 2010i	2/07
Fast Transient Burst Generator Model: EFT/B-101	2/07
Current Probe: Singer CP-105	2/07
Current Probe: Solar 9108-1N	2/07
Field Intensity Meter: EFM-018	2/07
KEYTEK Ecat Surge Generator	2/07
Bird Power Analyst Model 4391	7/07
Directional Couplers (Narda 3002-20, and 3042-20)	7/07 and 4/07

Annex C Qualifications

SCOT D. ROGERS, ENGINEER

ROGERS LABS, INC.

Mr. Rogers has approximately 17 years experience in the field of electronics. Six years working in the automated controls industry and 6 years working with the design, development and testing of radio communications and electronic equipment.

POSITIONS HELD:

Systems Engineer: A/C Controls Mfg. Co., Inc. 6 Years

Electrical Engineer: Rogers Consulting Labs, Inc. 5 Years

Electrical Engineer: Rogers Labs, Inc. Current

EDUCATIONAL BACKGROUND:

1) Bachelor of Science Degree in Electrical Engineering from Kansas State University.

2) Bachelor of Science Degree in Business Administration Kansas State University.

3) Several Specialized Training courses and seminars pertaining to Microprocessors and Software programming.

Scot D Rogers

Scot D. Rogers

September 11, 2007

Annex D FCC Site Approval Letter

FEDERAL COMMUNICATIONS COMMISSION
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

May 16, 2006

Registration Number: 90910

Rogers Labs, Inc.
4405 West 259th Terrace
Louisburg, KS 66053

Attention: Scot Rogers

Re: Measurement facility located at Louisburg
3 & 10 meter site
Date of Renewal: May 16, 2006

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,
Phyllis Parrish
Information Technician

Annex E Industry Canada Site Approval Letter

Industry Canada Industrie Canada

May 23rd, 2006

OUR FILE: 46405-3041
Submission No: 115252

Rogers Labs Inc.
4405 West 259th Terrace
Louisburg, KY
USA 66053

Dear Sir/Madame:

The Bureau has received your application for the Alternate Test Site or OATS and the filing is satisfactory to Industry Canada.

Please reference to the file number (**3041-1**) in the body of all test reports containing measurements performed on the site.

In the future, to obtain or renew a unique registration number, you may demonstrate that the site has been accredited to ANSI C63.4-2003 or later.

If the site is not accredited to ANSI C63.4-2003 or later, the test facility shall submit test data demonstrating conformance with the ANSI standard. The Department will evaluate the filing to determine if recognition shall be granted.

The frequency for re-validation of the test site and the information that is required to be filed or retained by the testing party shall comply with the requirements established by the accrediting organization. However, in all cases, test site re-validation shall occur on an interval not to exceed two years.

If you have any questions, you may contact the Bureau by e-mail at certification.bureau@ic.gc.ca
Please reference our file number above for all correspondence.

Yours sincerely,

Robert Corey
Manager Certification
Certification and Engineering Bureau
3701 Carling Ave., Building 94
Ottawa, Ontario K2H 8S2

Canada