



TEST REPORT

Report Number: 3125063LEX-001

Project Number: 31255063

Evaluation of Model Number: System 5000 PTU

FCC ID: OAM5000

FCC Part 15 Subpart B & FCC Part 15 Subpart C

For

iSECUREtrac Corporation

Test Performed by:

Intertek
731 Enterprise Drive
Lexington, KY 40510

Test Authorized by:

iSECUREtrac Corporation
5022 South 114th Street
Omaha, NE 68137

Prepared By: Jason Centers Date: 6/21/2007
Jason Centers, Senior Project Engineer

Approved By: Bryan C. Taylor Date: 6/21/2007
Bryan C. Taylor, Team Leader

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Intertek

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1 JOB DESCRIPTION

1.1 Company Information

Company Information	
Manufacturer:	iSECUREtrac Corporation
Address:	5022 South 114th Street Omaha, NE 68137
Contact Name:	Jef Higgason
Telephone Number:	(402) 537-5663
Email Address:	jhiggason@isecuretrac.com

1.2 Test Sample Information

The iSECUREtrac Corporation System 5000 PTU is a portable tracking unit that is used by law enforcement to locate and track offenders.

Test sample	
Model Number:	System 5000 PTU
Serial Number:	0000050115
FCC ID:	OAM5000
Device Category:	Mobile
RF Exposure Category:	General Population/Uncontrolled Environment
Transmission:	AM Modulation
Frequency Range (MHz)	439.21 MHz & 451.4 MHz
Antenna Type:	Wire Antenna
Antenna Location:	Internal

1.3 System Support Equipment

No support equipment was necessary for the evaluation.

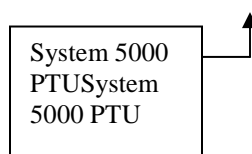
1.4 Cables Used During Testing

No cables were necessary for this evaluation.

1.5 System Block Diagram(s)

The diagrams below detail the interconnection of the EUT and its accessories during the testing.

Figure 1-1: Test Configuration



1.6 Mode(s) of operation / Engineering Judgments

The System 5000 PTU was powered by its internal battery. iSECUREtrac Corporation provided test commands to enable constant modulated transmission. Tests were performed on the two transmit frequencies on each internal antenna at the maximum output power and in receive mode. See the table below describing the operating modes referenced in this report.

Operating Mode	Frequency/Antenna Configuration
2	439.21 MHz, Modulated – Edge Antenna
4	451.4 MHz, Modulated – Edge Antenna
6	439.21 MHz, Modulated – Center Antenna
8	451.4 MHz, Modulated – Center Antenna

Evaluation For: iSECUREtrac Corporation
Model No: System 5000 PTU

FCC ID: OAM5000

2 EXECUTIVE SUMMARY

Testing performed for: iSECUREtrac Corporation

Equipment Under Test: System 5000 PTU

Receipt of Test Sample: 6/4/2007

Test Start Date: 6/7/2007

Test End Date: 6/15/2007

FCC RULE	DESCRIPTION OF TEST	RESULT	PAGE
§ 15.231, § 15.205	Field Strength of Fundamental and Spurious Radiation, Emission Bandwidth	Compliant	7
§ 15.231(a)(2)	Transmitter Activated Automatically Shall Cease Transmission Within 5 Seconds After Activation	Compliant¹	-
§ 15.109	Radiated Receiver Emissions	Compliant	15
§ 15.207	Conducted Voltage Emissions	NA²	-

2.1 Modifications required for compliance

No modifications were implemented by Intertek. All results in this report pertain to the un-modified sample provided to Intertek.

¹ The device complies with this requirement because the maximum duration of the transmission by design is 10 ms in 32 sec interval.

² The System 5000 PTU System 5000 PTU was not AC powered.

3 TEST FACILITY

All testing was completed at the INTERTEK-Lexington location at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1: 1993 and ANSI C63.4: 1992. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.

For radiated immunity testing, removable ferrite tiles are positioned between the transmitting antenna and the area occupied by the equipment under test. The remaining tests typically are performed outside the chamber on the conducting ground reference plane.



The Industry Canada filing number for this site is 2055A-1. The FCC registration number is 485103. The VCCI registration numbers are R-2056, C-2214, and T-195.

3.1 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration due date
Horn Antenna	EMCO	3115	6556	7/28/2007
EMI Receiver	Rohde & Schwarz	ESI 26	1088.7490	9/6/2007
Bilog Antenna	EMCO	3142C	00051864	11/14/2007
Preamplifier	Miteq	AFS44-00102000-30-10P-44	987410	6/15/2007
LISN	Fischer Custom Communication	FCC-LISN-50-50-2M	1026	5/11/2008

4 FIELD STRENGTH OF FUNDAMENTAL & SPURIOUS RADIATION, EMISSION BANDWIDTH

FCC §15.205, §15.231

4.1 Test Procedure

- Measurements were made over the frequency range of 30 MHz to ten times the highest frequency operating within the device.
- The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.
- From 30 to 1000 MHz, a quasi-peak detector was used for measurement. Above 1000 MHz, average measurements were performed. Measurements were made with the device oriented in three orthogonal axes and the highest level measured is reported.
- The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.
- The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.
- The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.
- The EUT was placed on a wooden table 80 cm above the ground reference plane.
- Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.
- The bandwidths of the fundamental emissions were measured 20 dB down from the modulated carrier using the ANSI C63.4 specified bandwidths. The bandwidth measurement was performed using a peak detector and the peak-hold function of the analyzer.
- The test was performed on the low and high transmitting frequencies at maximum output power.
- The readings obtained from the measurement receiver were corrected for antenna factor, cable loss, and pre-amp gain. An example calculation is shown below.

Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculation are listed below.

Formula:

$$FS = RA + AF + CF$$

FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (Quasi-Peak) in dB μ V

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB

Example Calculation:

$$RA = 19.48 \text{ dB}\mu\text{V}$$

$$AF = 18.52 \text{ dB}$$

$$CF = 0.78 \text{ dB}$$

$$FS = 19.48 + 18.52 + 0.78 = 38.78 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(38.78 \text{ dB}\mu\text{V/m})/20] = 86.89 \mu\text{V/m}$$

4.2 Test Results

The System 5000 PTU met the field strength and bandwidth requirements of FCC §15.231 for the fundamental and spurious emissions. Measurements were made with the device oriented in three orthogonal axes and the highest level measured is reported. See Table 4-1 for the measured fundamental and spurious emissions. The peak value of the fundamental and spurious emissions did not exceed the limits of FCC §15.231 5b. Additionally, there were no radiated emissions from the device in the restricted bands of §15.205 which exceeded the limit of §15.209. All other spurious emissions not shown below were greater than 20dB below the applicable limit. The 20dB bandwidth of the fundamental emission was less than 0.25% of the carrier frequency. See Exhibit 5 through Exhibit 8 for emission bandwidth plots.

Table 4-1: Field Strength of Fundamental and Spurious Radiation

Mode	TX Channel	Frequency	Polarity	Cable Factor (dB)	Antenna Factor (dB/m)	Corr. Peak Reading. (dBuV/m)	Corr. QP Reading (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Avg. Limit (dBuV/m)	Results
2	Low	439.2 MHz	H	3.21	16.77	72.874	62.644	62.354	81	Compliant
2	Low	878.43 MHz	H	4.56	22.7	46.504	43.454	40.384	61	Compliant
2	Low	439.19 MHz	V	3.21	16.24	68.591	68.251	67.561	81	Compliant
2	Low	878.4 MHz	V	4.56	21.77	52.873	47.853	42.023	61	Compliant
4	High	451.4 MHz	H	3.21	17.56	75.144	75.094	74.674	81.4	Compliant
4	High	902.86 MHz	H	4.61	23.44	49.819	47.199	43.509	61.4	Compliant
4	High	451.4 MHz	V	3.21	16.77	68.029	67.899	67.58	81.4	Compliant
4	High	902.85 MHz	V	4.61	22.26	46.073	42.643	38.663	61.4	Compliant
6	Low	439.19 MHz	H	3.21	16.77	75.643	75.323	74.733	81	Compliant
6	Low	439.2 MHz	V	3.21	16.24	68.362	68.242	67.781	81	Compliant
8	High	451.42 MHz	H	3.21	17.56	69.544	69.444	69.124	81.4	Compliant
8	High	451.4 MHz	V	3.21	16.77	62.17	61.9	61.65	81.4	Compliant

Graphical Peak Scan – Mode 2

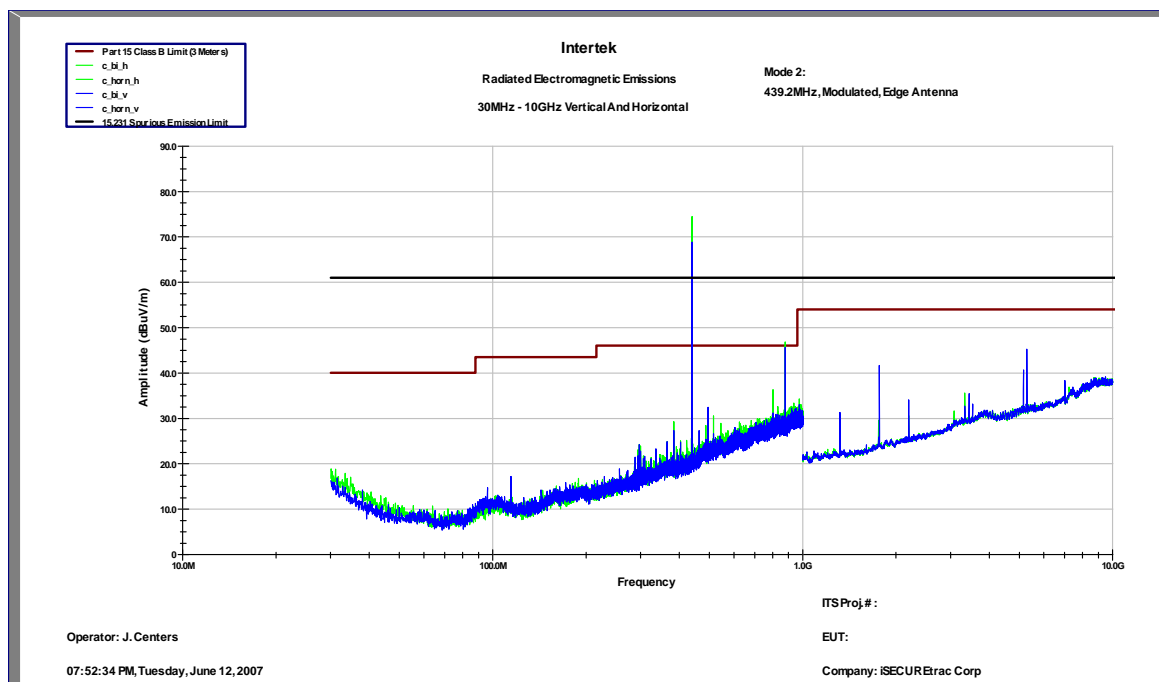


Exhibit 1

Graphical Peak Scan – Mode 4

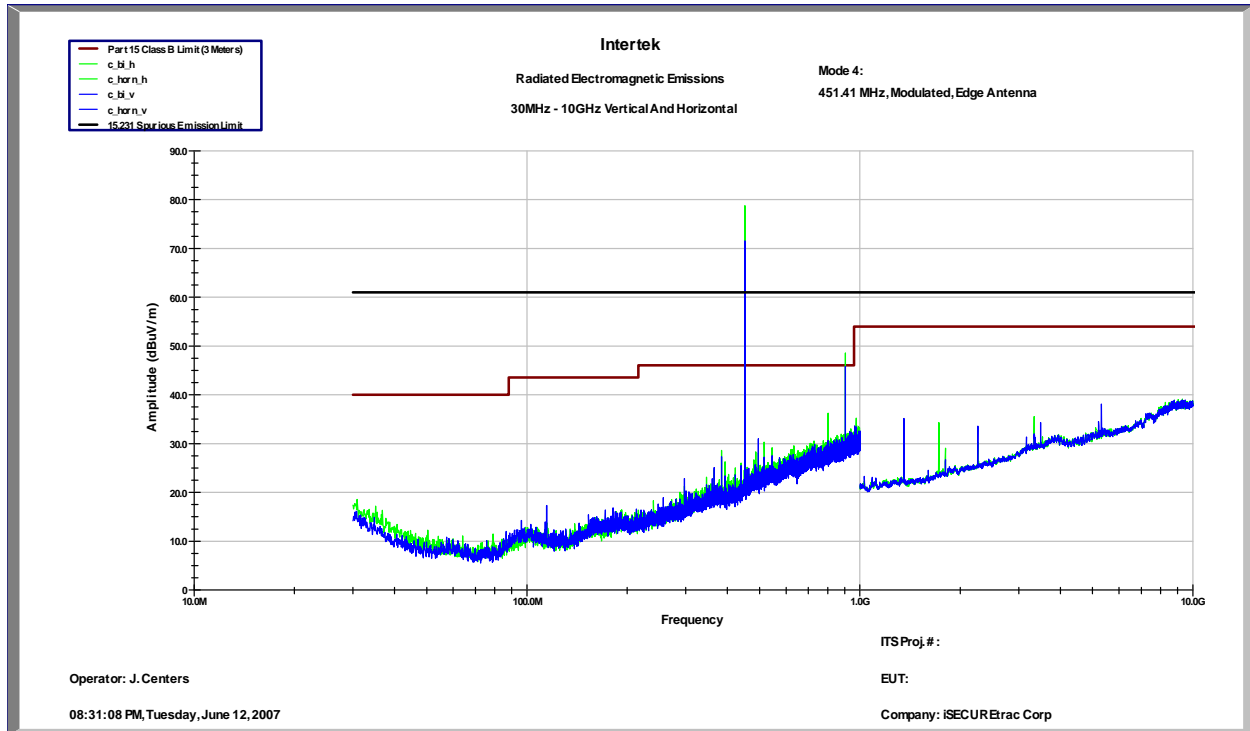


Exhibit 2

Graphical Peak Scan – Mode 6

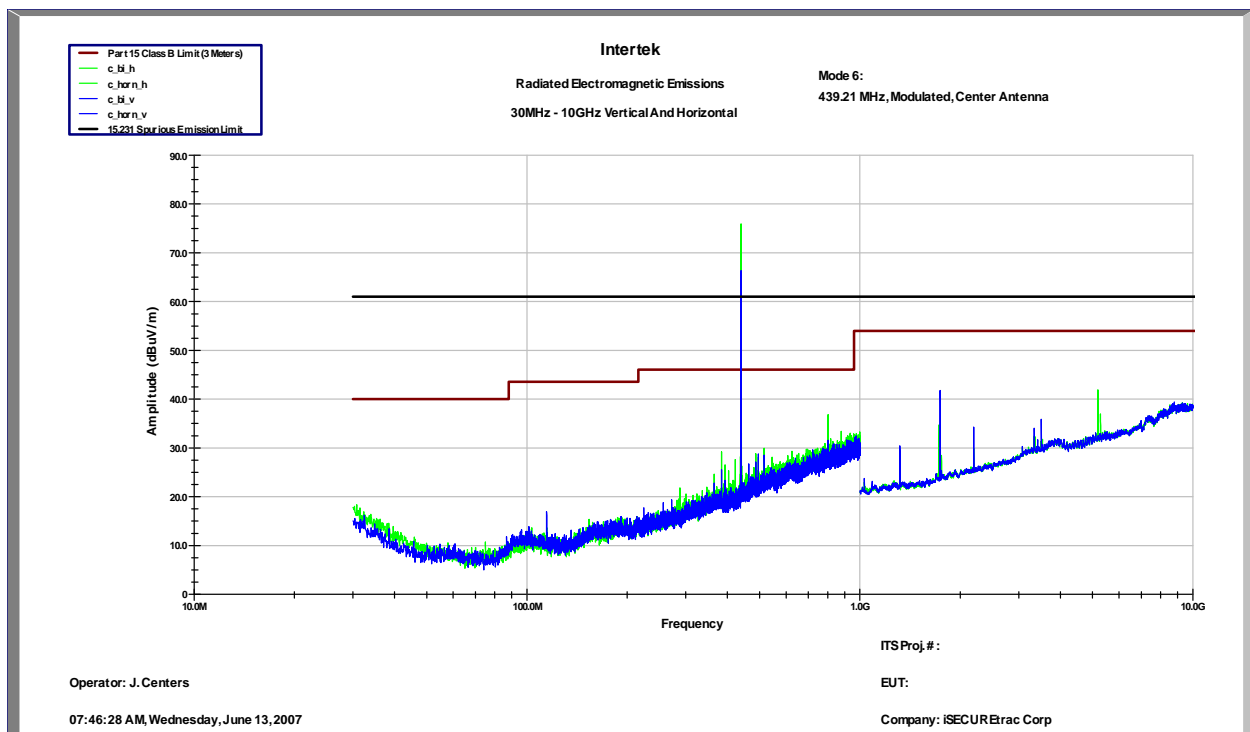


Exhibit 3

Graphical Peak Scan – Mode 8

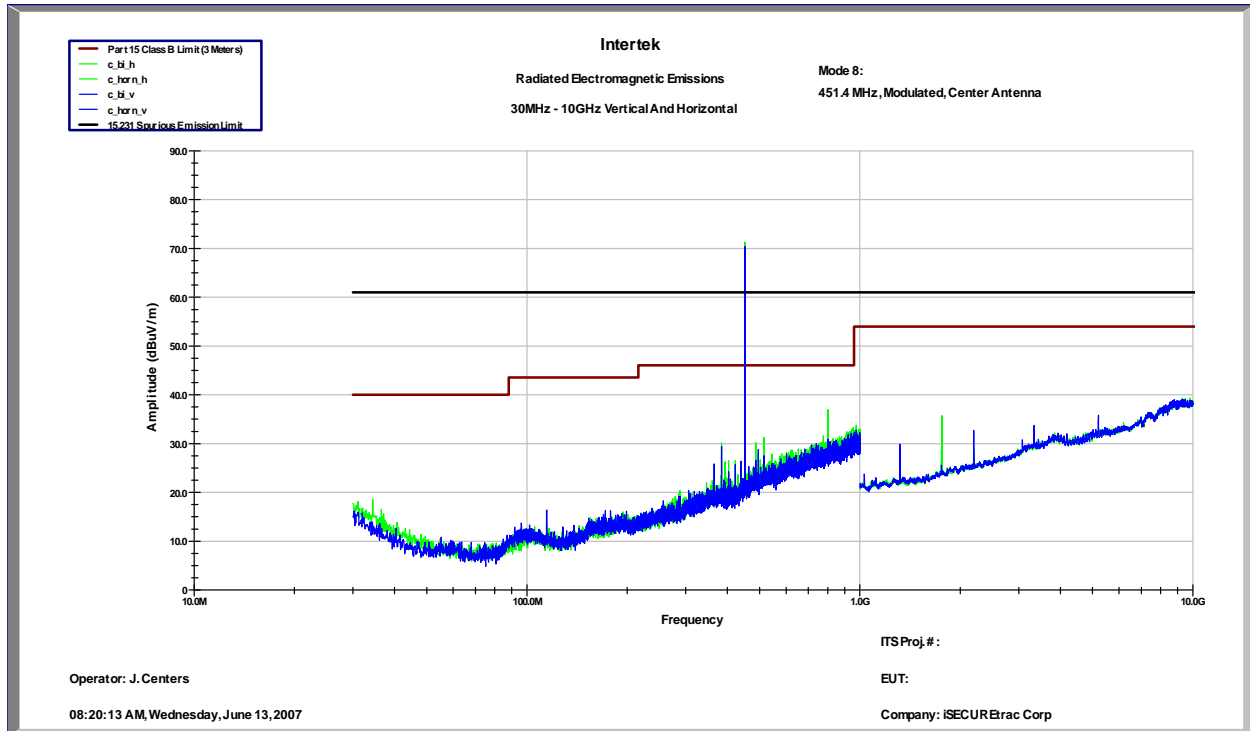
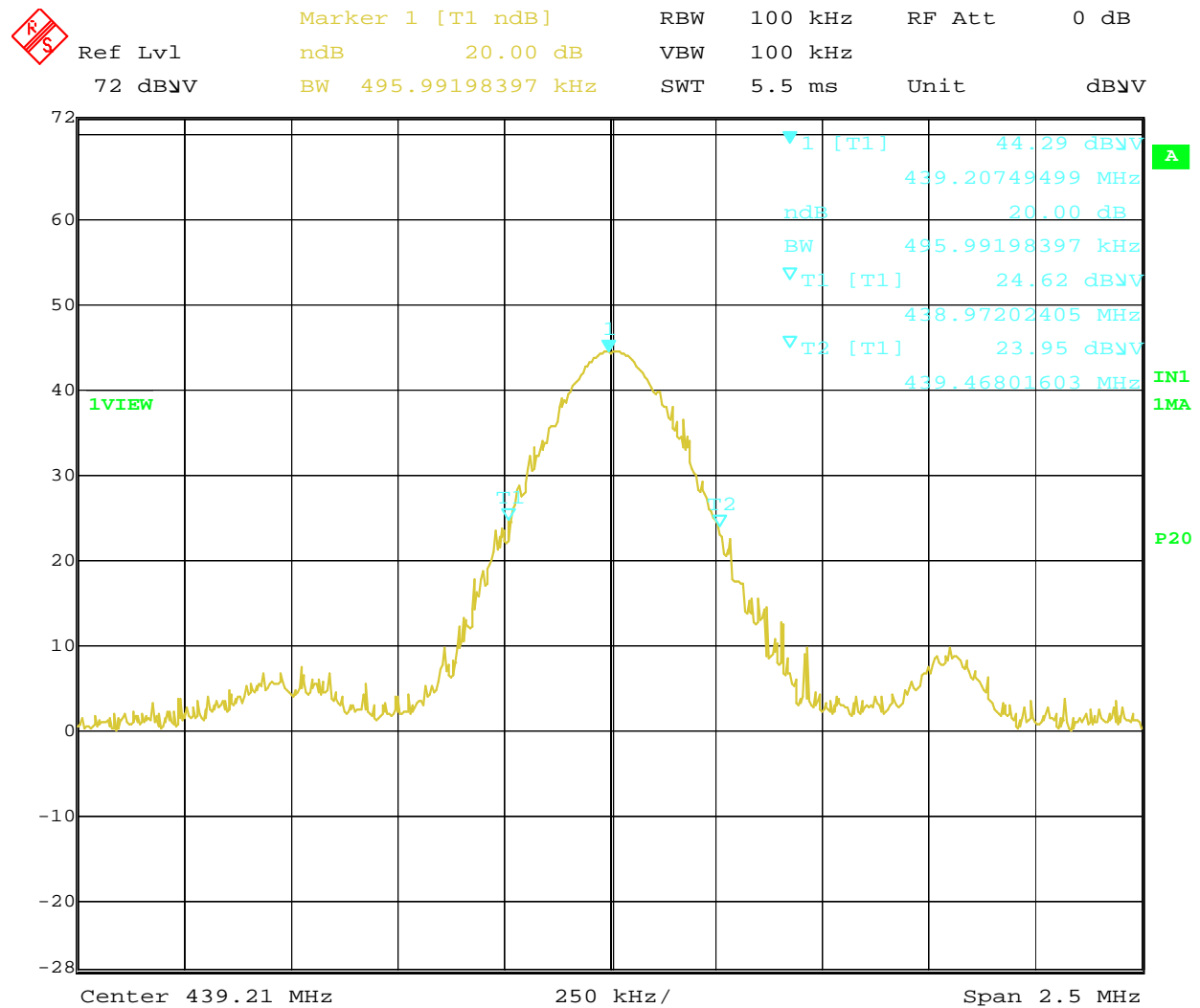


Exhibit 4

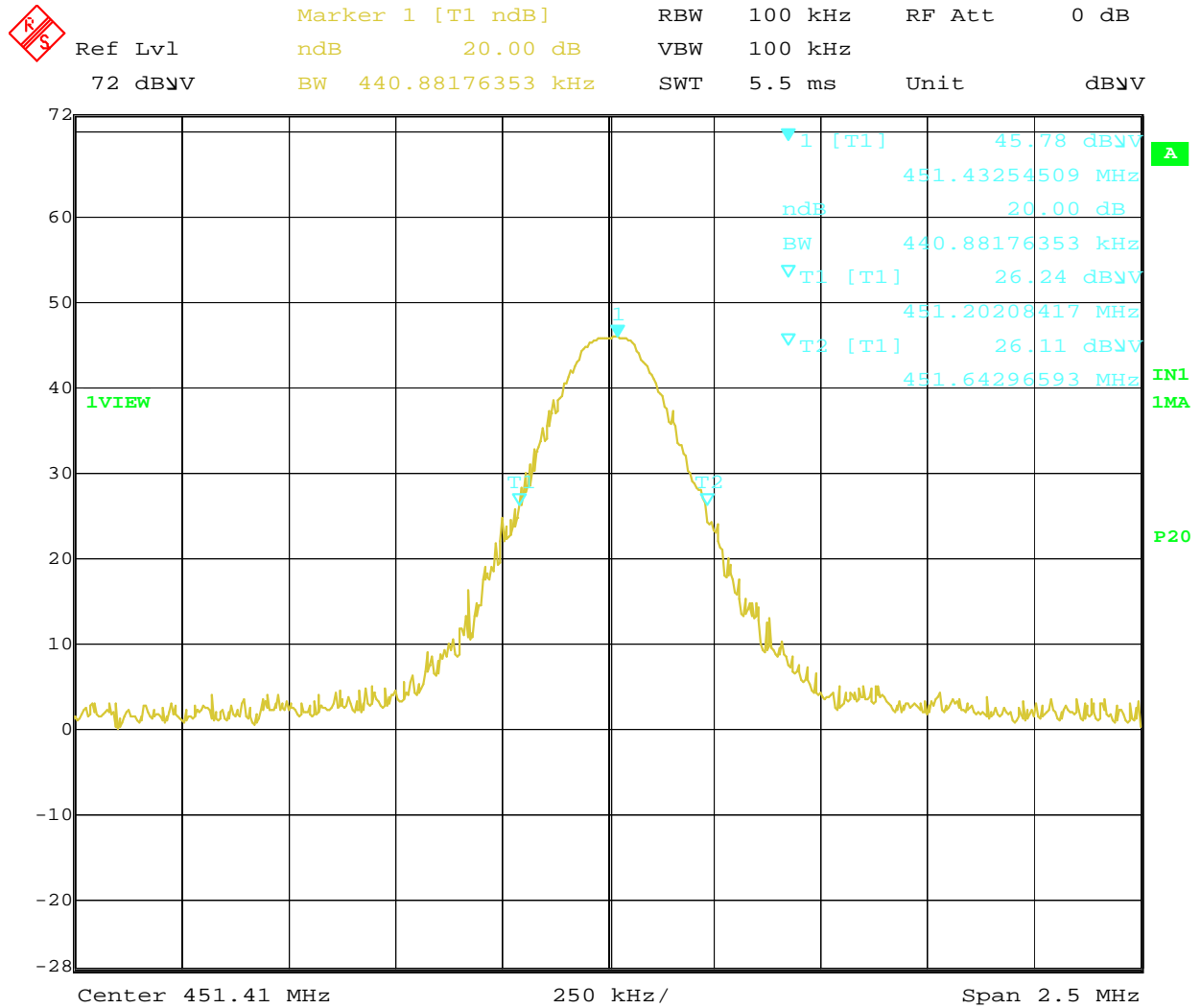
Emission Bandwidth – Mode 2



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Exhibit 5

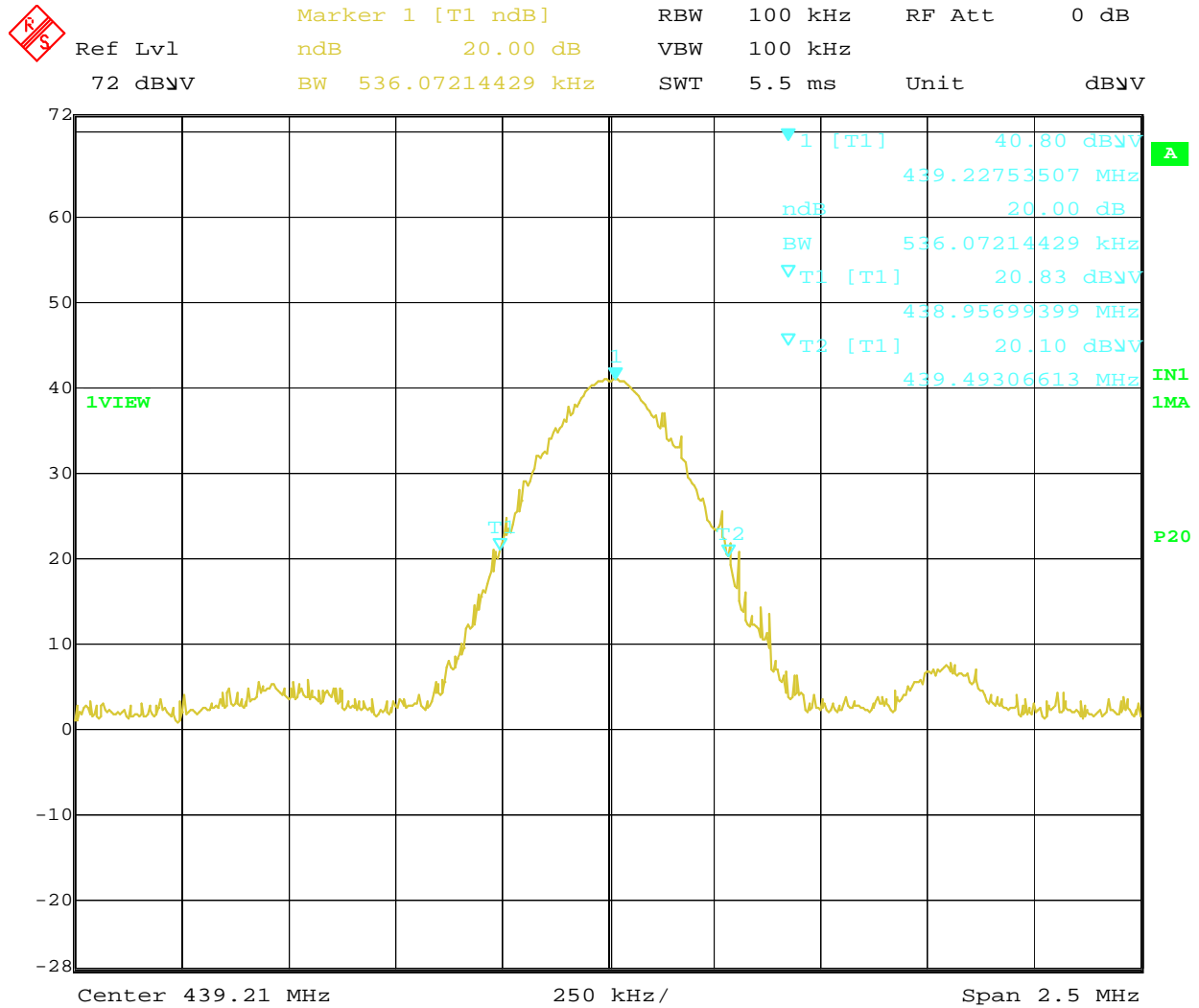
Emission Bandwidth – Mode 4



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Exhibit 6

Emission Bandwidth – Mode 6



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Exhibit 7

Exhibit 8

5 RADIATED RECEIVER EMISSIONS

FCC §15.109

ICES-003, RSS-Gen 6a

5.1 Test Procedure

- Measurements were made over the frequency range of 30 MHz to five times the highest frequency operating within the device.
- The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.
- From 30 to 1000 MHz, a quasi-peak detector was used for measurement. Above 1000 MHz, average measurements were performed.
- The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.
- The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.
- The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.
- The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.
- The test was performed on the device while in receive mode.
- Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.
- The readings obtained from the measurement receiver were corrected for antenna factor, cable loss, and pre-amp gain. An example calculation is shown below.

Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculation are listed below.

Formula:

$$FS = RA + AF + CF$$

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$$FS = 19.48 + 18.52 + 0.78 = 38.78 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(38.78 \text{ dB}\mu\text{V/m})/20] = 86.89 \mu\text{V/m}$$

5.2 Test Results

The System 5000 PTU was **compliant** with the radiated emissions requirements of FCC §15.109 of Class B limits. The maximized radiated emissions data can be found in Exhibit 9. Graphical results are shown in Exhibit 10.

Maximized Quasi Peak and Average Emissions (Sorted by Delta)

Test Engineer: Jason Centers

Test Start Date: 6/12/2007 **Test End Date:** 6/12/2007

Emission Limit Tested To: Class B **Test Distance (EUT to Antenna):** 3m

Frequency (MHz)	Polarity (H/V)	Cab. (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Results
440.71 MHz	H	3.2	16.86	37.08	46.02	-8.94	Compliant
440.71 MHz	V	3.2	16.34	36.73	46.02	-9.29	Compliant
801.83 MHz	H	4.36	22.04	36.06	46.02	-9.96	Compliant
495.24 MHz	V	3.36	17.7	33.31	46.02	-12.71	Compliant
384.0 MHz	H	2.94	16.04	31.09	46.02	-14.93	Compliant
486.82 MHz	H	3.36	18.53	29.35	46.02	-16.67	Compliant

Exhibit 9

Graphical Peak Scan

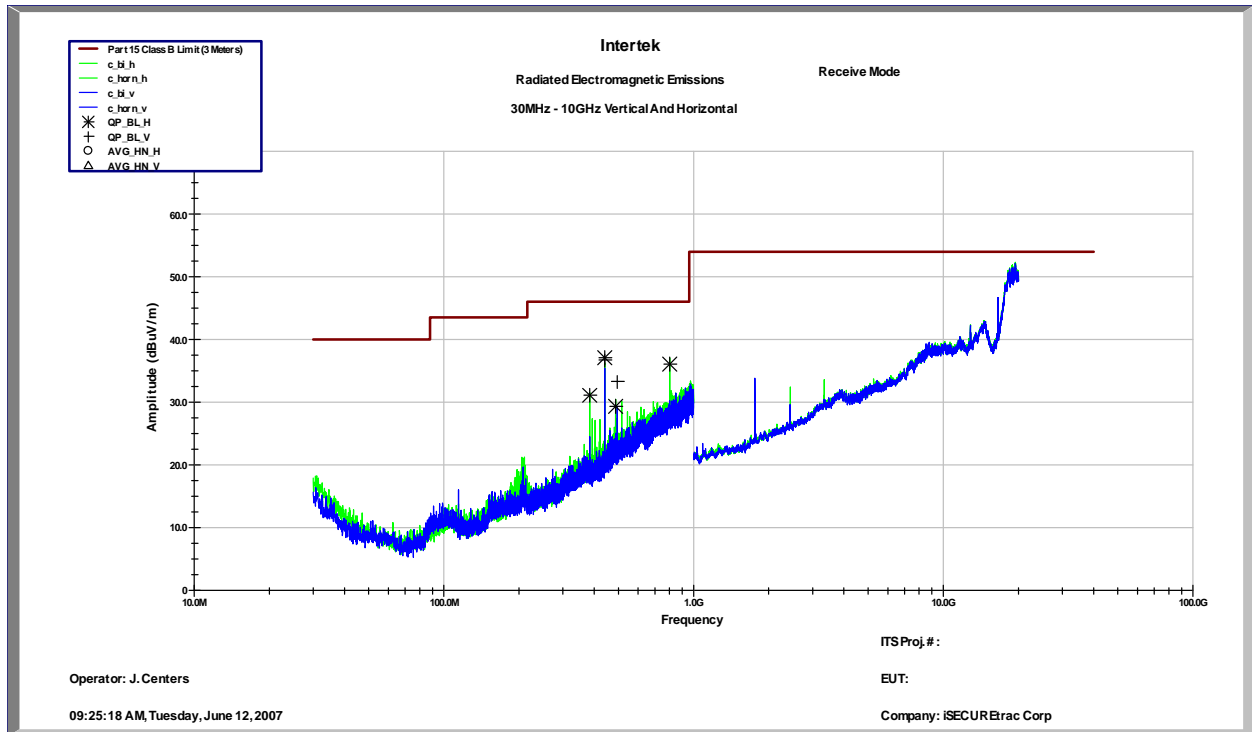


Exhibit 10