



## TEST REPORT

**Report Number: 3124731LEX-001**

**Project Number: 3124731**

**Evaluation of the Mail Matrix Transceiver**

**Model Number: 2033210**

**FCC ID: VDM2033210**

**Industry Canada ID: 7175A2033210**

**FCC Part 15 Subpart B & FCC Part 15 Subpart C**

**ICES-003 & RSS-210 Issue 6**

**For**

**Opex Incorporated**

Test Performed by:

Intertek  
731 Enterprise Drive  
Lexington, KY 40510

Test Authorized by:

Opex Incorporated  
305 Commerce Drive  
Moorestown, NJ 08057

Prepared By:

Date:

6/8/2007

Jason Centers, Senior Project Engineer

Approved By:

Date:

6/8/2007

Bryan C. Taylor, Team Leader

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**Intertek**

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## 1 JOB DESCRIPTION

### 1.1 Company Information

Company Information	
<b>Manufacturer:</b>	Opex Incorporated
<b>Address:</b>	305 Commerce Drive Moorestown, NJ 08057
<b>Contact Name:</b>	Michael Powell
<b>Telephone Number:</b>	(856) 727-1100
<b>Email Address:</b>	mpowell@opex.com

### 1.2 Test Sample Information

The product in which the transceiver - model 2033210 - is used, is OPEX model: MAIL MATRIX. The MAIL MATRIX is used for sorting incoming mail in large institutions, such as universities and hospitals, ect. The transceiver is used to communicate bidirectionally to wireless robotic delivery carts which carry mail pieces to destination bins within the MAIL MATRIX machine. A maximum of forty delivery carts can be controlled within a MAIL MATRIX machine, with a maximum of 1020 destination bins. Application software executed on a PC provides the MAIL MATRIX operator interface. Embedded within the application is delivery cart traffic control, which is transparent to the operator. The traffic control permits integration of the multiple carts which simultaneously move about in the MAIL MATRIX machine.

Test sample	
<b>Model Number:</b>	2033210
<b>Serial Number:</b>	Not Labeled
<b>FCC ID:</b>	VDM2033210
<b>Device Category:</b>	Mobile
<b>RF Exposure Category:</b>	General Population/Uncontrolled Environment
<b>Transmission:</b>	Zigbee, 0-QPSK Modulation
<b>Frequency Range (MHz)</b>	2405-2480
<b>Antenna Type:</b>	PCB Antenna
<b>Antenna Location:</b>	Internal

### 1.3 System Support Equipment

The support equipment used during the evaluation is listed in the table below.

*Support Equipment Used in Setup*

Description	Manufacturer	Model Number	Serial Number
Controller Board	Opex	Mail Matrix	Not Labeled
Laptop	Compaq	Evo N410c	7E32KX21C02H

*Exhibit 1*

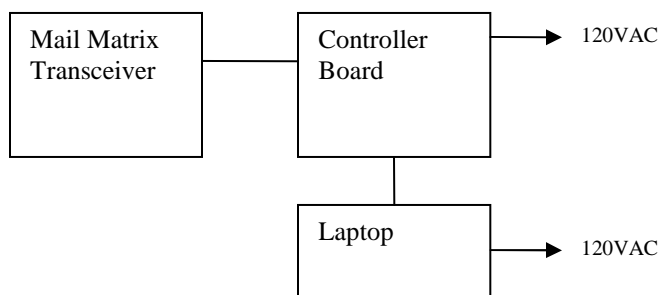
#### 1.4 Cables Used During Testing

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
CAT5 Cable	6 ft.	No	No	EUT	Controller Board

#### 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 Mail Matrix Transceiver was powered a controller board that is intended to be connected to the Mail Matrix Transceiver during normal operation. Opex Incorporated provided test commands to enable constant transmission at the maximum duty cycle that will be used in normal operation. Tests were performed on the high, middle, and low channels at maximum output power and in receive mode.

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## 2 EXECUTIVE SUMMARY

Testing performed for: Opex Incorporated

Equipment Under Test: 2033210

Receipt of Test Sample: 6/1/2007

Test Start Date: 6/1/2007

Test End Date: 6/6/2007

FCC RULE	IC RULE	DESCRIPTION OF TEST	RESULT	PAGE
§15.249, 15.209	RSS-210:2.6, RSS-210:A2.9	Field Strength of Spurious Radiation	<b>Compliant</b>	7
§15.109	ICES-003, RSS-Gen 6a	Radiated Receiver Emissions	<b>Compliant</b>	13
§15.207	ICES-003, RSS-Gen 7.2.2	Conducted Voltage Emissions	<b>Compliant</b>	16

### 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.

### 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 2055. 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 SPURIOUS RADIATION**

FCC §15.209, §15.249

RSS-210:2.6, RSS-210:A2.9

### **4.1 Test Procedure**

- Measurements are 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.
- 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. Measurements were made with the device oriented in three orthogonal axes and the highest level measured is reported.
- Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.
- The test was performed on the low, middle, and highest transmitting frequencies at maximum output power.
- For fundamental emissions near the restricted bands of §15.205, measurements were performed to show compliance with the limits in the restricted band. If the fundamental emission is within two standard bandwidths of the restricted band, the “marker delta-method” was performed. The EUT azimuth and antenna height were varied to obtain a maximum field-strength reading. The analyzer reading was corrected for cable loss, antenna factor, and pre-amp gain. Using bandwidths and detectors required by ANSI C63.4 an in-band measurement of the fundamental emission was performed. After obtaining a corrected reading for the fundamental emission, the spectrum analyzer was setup with a span large enough to capture the fundamental emission and the band-edge under investigation. A resolution bandwidth of 1% of the span (not less than 30kHz) was used. Several sweeps were performed in peak-hold mode. The amplitude delta between the peak of the fundamental emission and the peak emission at the restricted band edge was recorded. The amplitude delta is subtracted from the maximized field strength reading to determine compliance at the band-edge.
- If the fundamental emission is more two standard bandwidths from the restricted band, a spectrum analyzer was setup to sweep through the restricted band. The analyzer reading was corrected for cable loss, antenna factor, and pre-amp gain. The EUT azimuth and antenna height were varied to obtain a maximum field-strength reading. Several sweeps were performed in max-hold mode and the result was compared to the limits of §15.209.
- The readings obtained from the measurement receiver were corrected for antenna factor, cable loss, and pre-amp gain. An example calculation is shown below.

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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 $\mu$ V/m

RA = Receiver Amplitude (Quasi-Peak) in dB $\mu$ V

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB

Example Calculation:

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

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

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

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

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



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## 4.2 Test Results

The Mail Matrix Transceiver met the field strength requirements of FCC §15.249 for the fundamental, harmonics and spurious emissions. See Table 4-1 and for the measured fundamental and spurious emissions. All other spurious emissions not shown below were greater than 20dB below the limit.

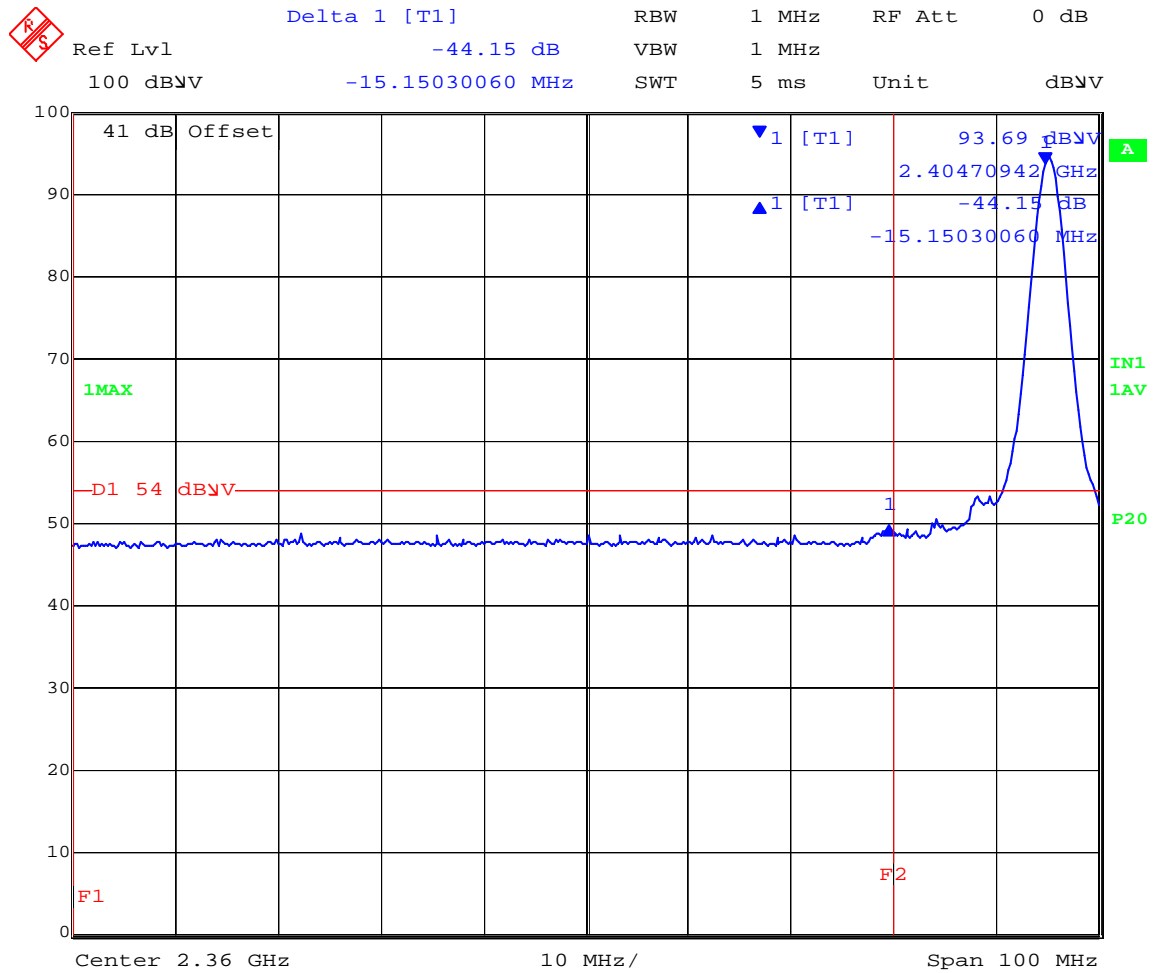
Table 4-1: Field Strength of Spurious Radiation

TX Channel	Frequency	Polarity	Corr. Peak Reading. (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Peak Limit (dBuV/m)	Avg. Limit (dBuV/m)	Results	Comments
Low	2.4053 GHz	H	100.672	78.79	114	94	Compliant	Fundamental
Low	2.4045 GHz	V	95.63	72.73	114	94	Compliant	Fundamental
Low	4.8091 GHz	H	40.846	31.17	74	54	Compliant	
Low	7.217 GHz	H	44.274	35.63	74	54	Compliant	
Low	4.8111 GHz	V	36.436	31.28	74	54	Compliant	
Low	7.2172 GHz	V	43.827	35.5	74	54	Compliant	
Middle	2.4398 GHz	H	96.847	86.14	114	94	Compliant	Fundamental
Middle	2.4399 GHz	V	90.47	79.91	114	94	Compliant	Fundamental
Middle	4.8813 GHz	H	41.728	31.68	74	54	Compliant	
Middle	7.3217 GHz	H	43.438	35.51	74	54	Compliant	
Middle	4.8794 GHz	V	38.495	32.64	74	54	Compliant	
Middle	7.322 GHz	V	42.686	35.58	74	54	Compliant	
High	2.48 GHz	H	97.244	84.09	114	94	Compliant	Fundamental
High	2.4798 GHz	V	87.969	77.54	114	94	Compliant	Fundamental
High	4.9611 GHz	H	40.366	34.14	74	54	Compliant	
High	7.4391 GHz	H	45.1	36.63	74	54	Compliant	
High	4.96 GHz	V	34.833	30.41	74	54	Compliant	
High	7.4388 GHz	V	43.625	35.43	74	54	Compliant	

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Band-Edge Compliance: 2310MHz – 2390MHz Restricted Band, Low Channel



Date: 4.JUN.2007 09:37:26

Exhibit 2

Evaluation For: Opex Incorporated  
Model No: 2033210

FCC ID: VDM2033210  
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Band-Edge Compliance (Marker-Delta Method): 2483.5MHz – 2500MHz Restricted Band, High Channel Peak Detector

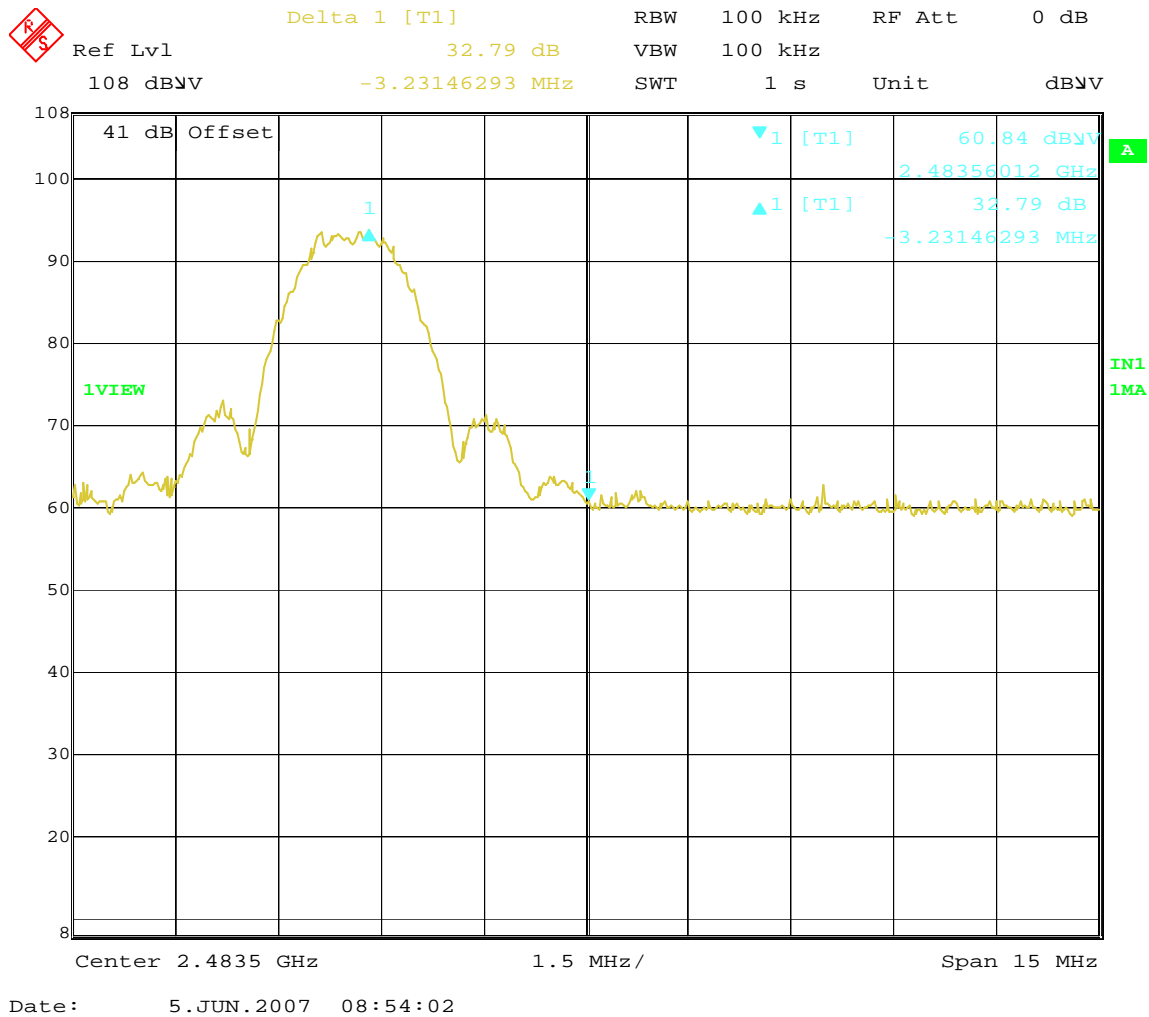


Exhibit 3

Peak Field Strength: 97.24 dBuV/m

Marker Delta Peak: 32.79 dB

Band-Edge Measurement = 97.24 dBuV/m – 32.79 dB = 64.45 dBuV/m

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Model No: 2033210

FCC ID: VDM2033210  
IC ID: 7175A2033210

Band-Edge Compliance (Marker-Delta Method): 2483.5MHz – 2500MHz Restricted Band, High Channel Average Detector

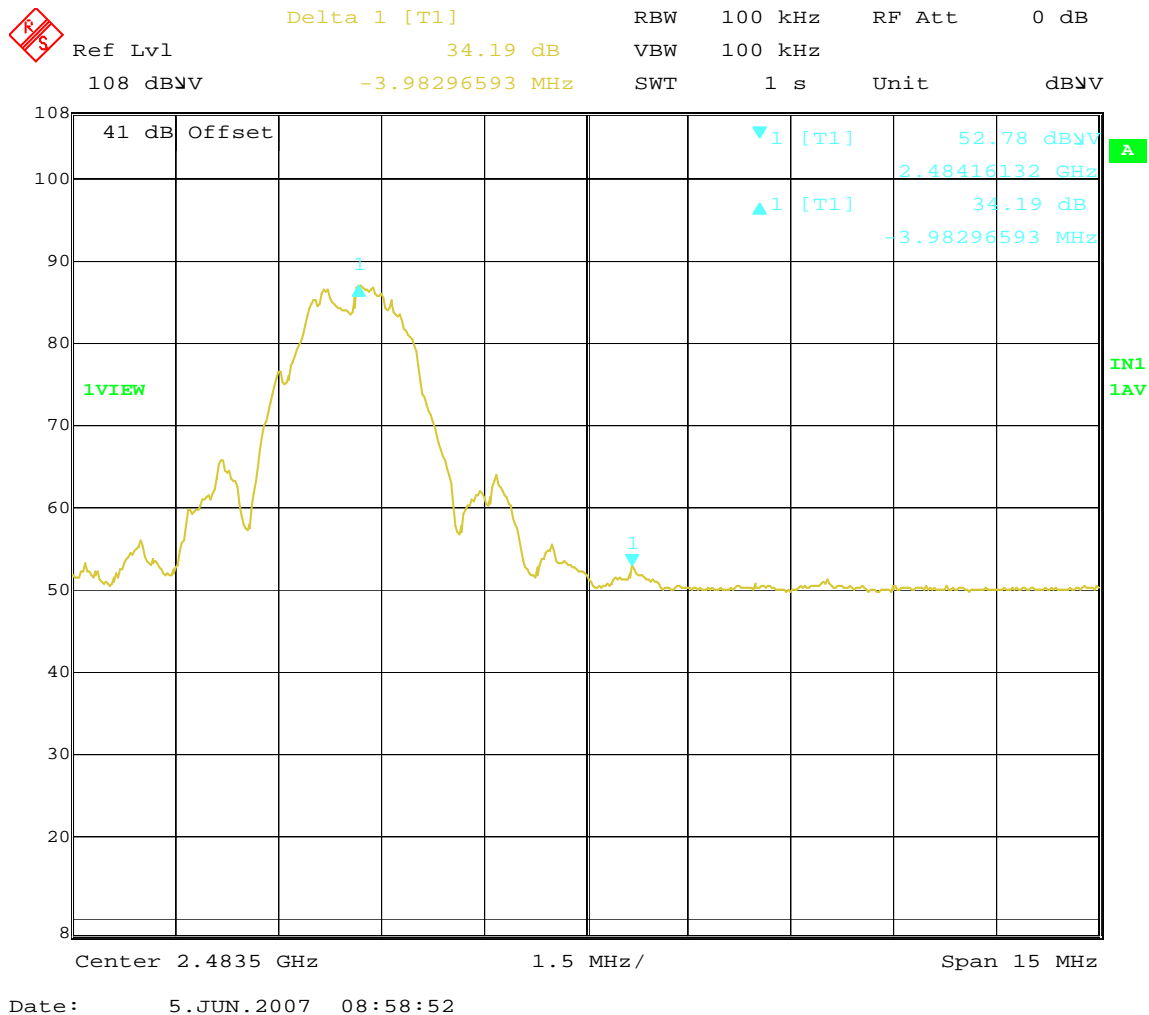


Exhibit 4

Average Field Strength: 84.09 dBuV/m

Marker Delta Average: 34.19 dB

Band-Edge Measurement = 84.19 dBuV/m – 34.19 dB = 49.9 dBuV/m

## **5 RADIATED RECEIVER EMISSIONS**

FCC §15.109

ICES-003, RSS-Gen 6a

### **5.1 Test Procedure**

- Measurements are 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:

$$FS = RA + AF + CF$$

FS = Field Strength in dBμV/m

RA = Receiver Amplitude (Quasi-Peak) in dBμV

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB

Example Calculation:

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

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

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

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

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

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## 5.2 Test Results

The Mail Matrix Transceiver 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 5. Graphical results are shown in Exhibit 6.

### Maximized Quasi Peak and Average Emissions (Sorted by Delta)

<b>Test Engineer:</b> Jason Centers							
<b>Test Start Date:</b> 6/4/2007 <b>Test End Date:</b> 6/4/2007							
<b>Emission Limit Tested To:</b> Class B <b>Test Distance (EUT to Antenna):</b> 3m							
Frequency (MHz)	Polarity (H/V)	Cab. (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Results
801.8 MHz	H	4.35	22.04	34.65	46.02	-11.37	<b>Compliant</b>
495.25 MHz	V	3.36	17.7	30.58	46.02	-15.44	<b>Compliant</b>
495.28 MHz	H	3.36	18.29	30.21	46.02	-15.81	<b>Compliant</b>
98.08 MHz	V	1.37	9.01	26.35	43.52	-17.17	<b>Compliant</b>
123.1 MHz	V	1.69	7.61	24.72	43.52	-18.8	<b>Compliant</b>
973.66 MHz	V	4.8	22.87	35.13	53.98	-18.85	<b>Compliant</b>
129.6 MHz	V	1.76	7.5	24.23	43.52	-19.29	<b>Compliant</b>

Exhibit 5

Evaluation For: Opex Incorporated  
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### Graphical Peak Scan

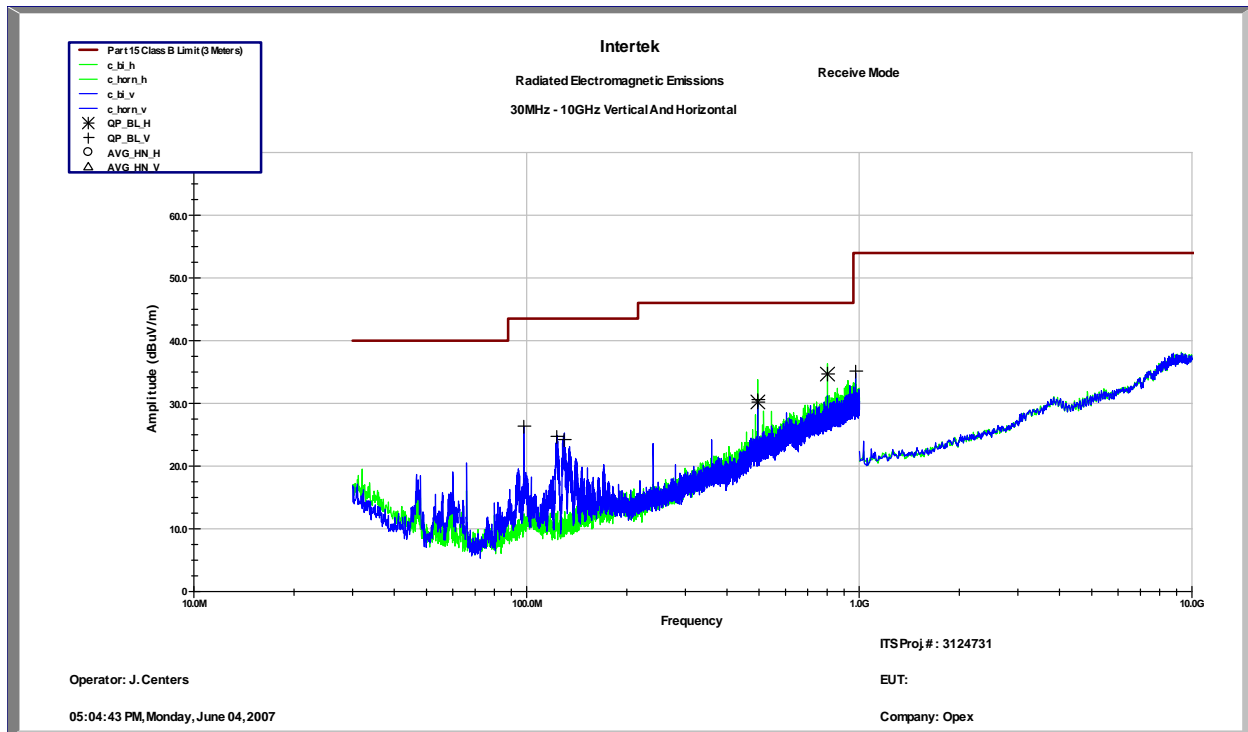


Exhibit 6

## 6 CONDUCTED VOLTAGE EMISSIONS

§ 15.207

ICES-003

RSS-Gen 7.2.2

### 6.1 Test Method:

Conducted voltage emission measurements were performed as follows:

- The Mail Matrix Transceiver was connected to the power source using a Line Impedance Stabilization Network (LISN) in line with each current carrying conductor.
- A spectrum analyzer was connected to the RF port of the LISN installed on the line under test.
- The LISNs installed on all lines not under test were terminated into 50  $\Omega$ .
- The Mail Matrix Transceiver was powered.
- The orientation of each connecting cable was varied to find the configuration that maximized the conducted emission.
- The insertion loss of the measurement cable, the LISN insertion loss, and the output of the spectrum analyzer were added together to give a corrected reading in dBuV.
- The corrected reading was compared to the limit above to determine compliance.
- A quasi-peak and/or average detector was used for measurements close to or exceeding the limit with a peak detector.
- The test was performed on the low, middle and highest transmitting frequencies at maximum output power.



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Evaluation For: Opex Incorporated  
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## 6.2 Test Results:

The Mail Matrix Transceiver was **compliant** with conducted voltage emissions requirements of Part 15.207. No conducted voltage emissions on the AC power interface exceeded the quasi-peak or average limits. See Exhibit 7 through Exhibit 10 for tabular and graphical results of conducted voltage emissions.

Evaluation For: Opex Incorporated  
Model No: 2033210

FCC ID: VDM2033210  
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Conducted Voltage Emissions Tabular Data (L1 & L2) – Low Channel

**Test Engineer:** Jason Centers

**Test Start Date:** 6/5/2007 **Test End Date:** 6/5/2007

**Emission Limit Tested To:** 15.207

**General Notes / Comments / Performance Monitoring Method:**

Device powered by 120VAC, 60Hz

Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Phase	150.0 KHz	50.49	66	-15.51	25.62	56	-30.38	Compliant
Phase	168.0 KHz	48.39	65.06	-16.67	24.55	55.49	-30.94	Compliant
Phase	204.0 KHz	53.58	63.45	-9.87	45.37	54.46	-9.09	Compliant
Phase	304.9 KHz	49.76	60.11	-10.35	40.86	51.57	-10.72	Compliant
Phase	406.2 KHz	50.89	57.73	-6.84	41.71	48.68	-6.97	Compliant
Phase	24.377 MHz	45.7	60	-14.3	28.25	50	-21.75	Compliant
Phase	26.249 MHz	47.65	60	-12.35	29.4	50	-20.6	Compliant
Neutral	150.0 KHz	47.88	66	-18.12	24.57	56	-31.43	Compliant
Neutral	168.0 KHz	46.27	65.06	-18.79	23.77	55.49	-31.72	Compliant
Neutral	204.0 KHz	46.74	63.45	-16.71	38.99	54.46	-15.47	Compliant
Neutral	304.9 KHz	45.19	60.11	-14.92	36.19	51.57	-15.39	Compliant
Neutral	407.4 KHz	43.45	57.7	-14.25	38.13	48.65	-10.52	Compliant
Neutral	24.374 MHz	46.22	60	-13.78	28.59	50	-21.41	Compliant
Neutral	26.253 MHz	46.59	60	-13.41	28.99	50	-21.01	Compliant

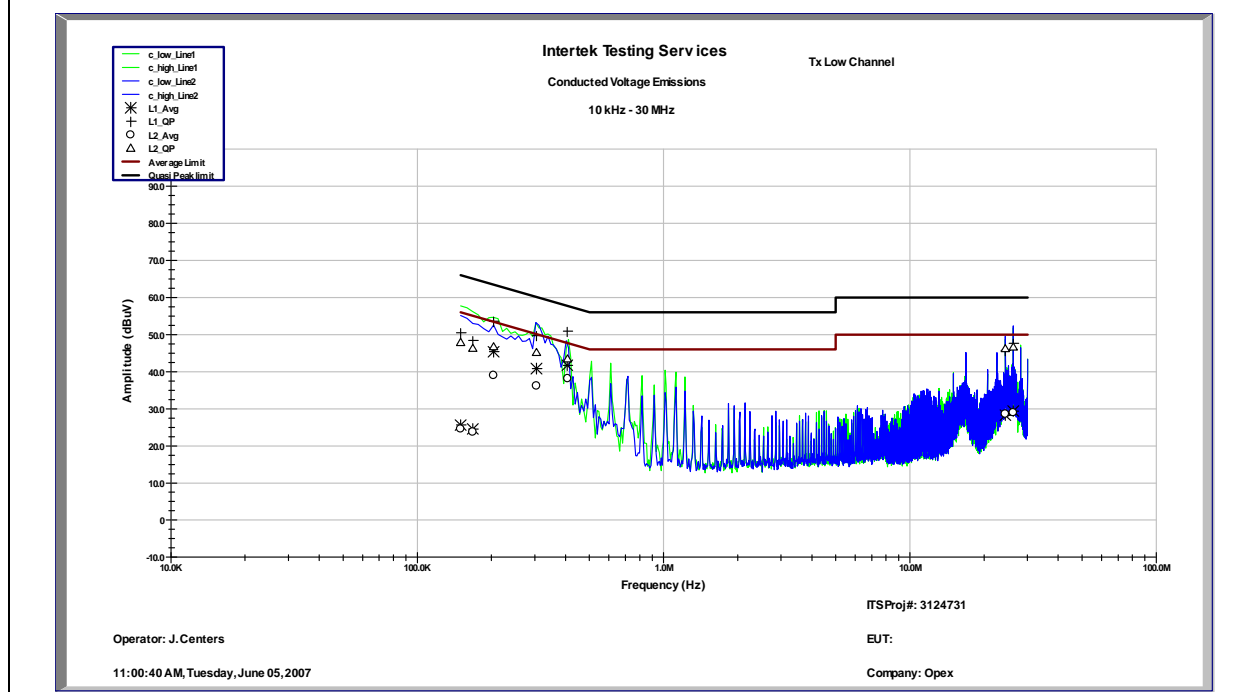


Exhibit 7

Evaluation For: Opex Incorporated  
Model No: 2033210

FCC ID: VDM2033210  
IC ID: 7175A2033210

Conducted Voltage Emissions Tabular Data (L1 & L2) – Mid Channel

**Test Engineer:** Jason Centers

**Test Start Date:** 6/5/2007 **Test End Date:** 6/5/2007

**Emission Limit Tested To:** 15.207

**General Notes / Comments / Performance Monitoring Method:**

Device powered by 120VAC, 60Hz

Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Phase	150.0 KHz	49.95	66	-16.05	25.37	56	-30.63	Compliant
Phase	168.0 KHz	48.03	65.06	-17.03	24.39	55.49	-31.1	Compliant
Phase	202.9 KHz	53.58	63.49	-9.91	45.23	54.49	-9.25	Compliant
Phase	304.9 KHz	50.31	60.11	-9.8	40.74	51.57	-10.84	Compliant
Phase	406.2 KHz	51.49	57.73	-6.24	41.66	48.68	-7.02	Compliant
Phase	24.372 MHz	45.64	60	-14.36	28.24	50	-21.76	Compliant
Phase	26.248 MHz	47.36	60	-12.64	29.22	50	-20.78	Compliant
Neutral	150.0 KHz	47.99	66	-18.01	24.69	56	-31.31	Compliant
Neutral	168.0 KHz	46.25	65.06	-18.81	23.73	55.49	-31.76	Compliant
Neutral	202.9 KHz	46.91	63.49	-16.58	38.99	54.49	-15.49	Compliant
Neutral	304.9 KHz	44.94	60.11	-15.17	36.22	51.57	-15.36	Compliant
Neutral	406.2 KHz	43.81	57.73	-13.92	38.19	48.68	-10.49	Compliant
Neutral	24.374 MHz	46.13	60	-13.87	28.53	50	-21.47	Compliant
Neutral	26.249 MHz	47.55	60	-12.45	30.16	50	-19.84	Compliant

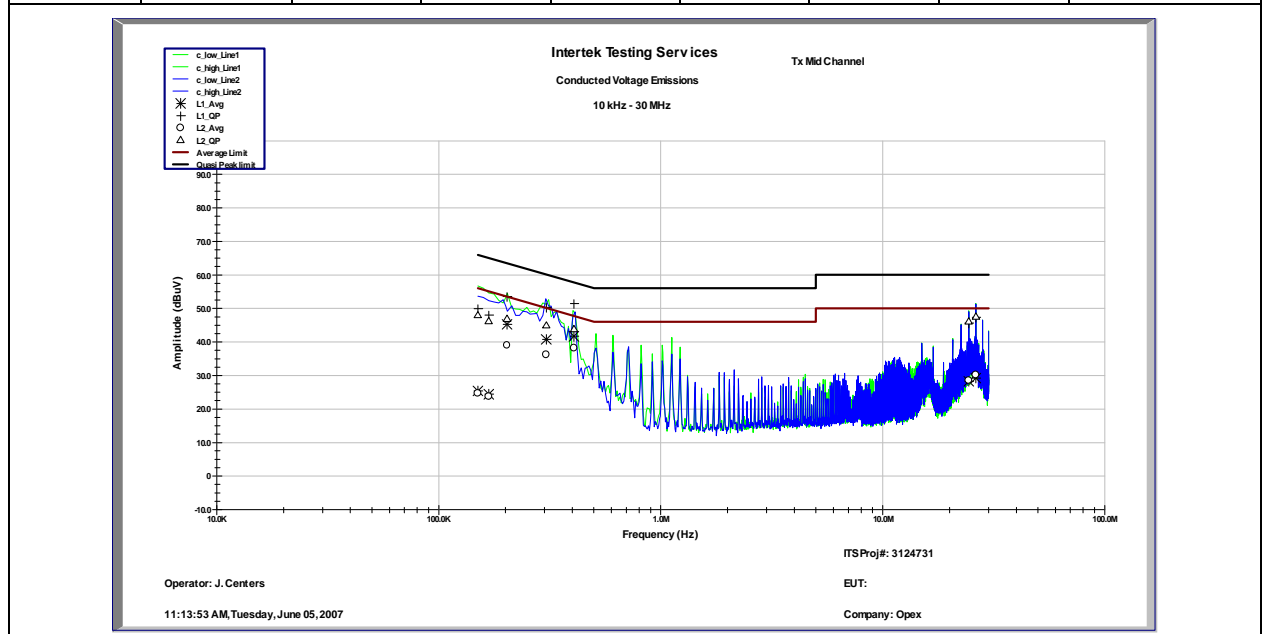


Exhibit 8

Evaluation For: Opex Incorporated  
Model No: 2033210

FCC ID: VDM2033210  
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Conducted Voltage Emissions Tabular Data (L1 & L2) – High Channel

**Test Engineer:** Jason Centers

**Test Start Date:** 6/5/2007 **Test End Date:** 6/5/2007

**Emission Limit Tested To:** 15.207

**General Notes / Comments / Performance Monitoring Method:**

Device powered by 120VAC, 60Hz

Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Phase	150.0 KHz	49.88	66	-16.12	25.44	56	-30.56	Compliant
Phase	168.0 KHz	48.18	65.06	-16.88	24.43	55.49	-31.06	Compliant
Phase	206.3 KHz	51.01	63.35	-12.34	42.75	54.39	-11.64	Compliant
Phase	304.5 KHz	50.39	60.12	-9.73	40.53	51.59	-11.06	Compliant
Phase	407.3 KHz	51.66	57.7	-6.05	41.93	48.65	-6.72	Compliant
Phase	24.376 MHz	45.95	60	-14.05	28.41	50	-21.59	Compliant
Phase	26.221 MHz	47.34	60	-12.66	29.18	50	-20.82	Compliant
Neutral	150.0 KHz	48.03	66	-17.97	24.67	56	-31.33	Compliant
Neutral	168.0 KHz	45.7	65.06	-19.36	23.61	55.49	-31.88	Compliant
Neutral	204.4 KHz	46.48	63.43	-16.95	38.79	54.45	-15.66	Compliant
Neutral	304.9 KHz	44.62	60.11	-15.49	36.17	51.57	-15.41	Compliant
Neutral	406.8 KHz	43.84	57.71	-13.88	38.25	48.66	-10.42	Compliant
Neutral	24.371 MHz	45.51	60	-14.49	28.17	50	-21.83	Compliant
Neutral	26.246 MHz	46.53	60	-13.47	28.73	50	-21.27	Compliant

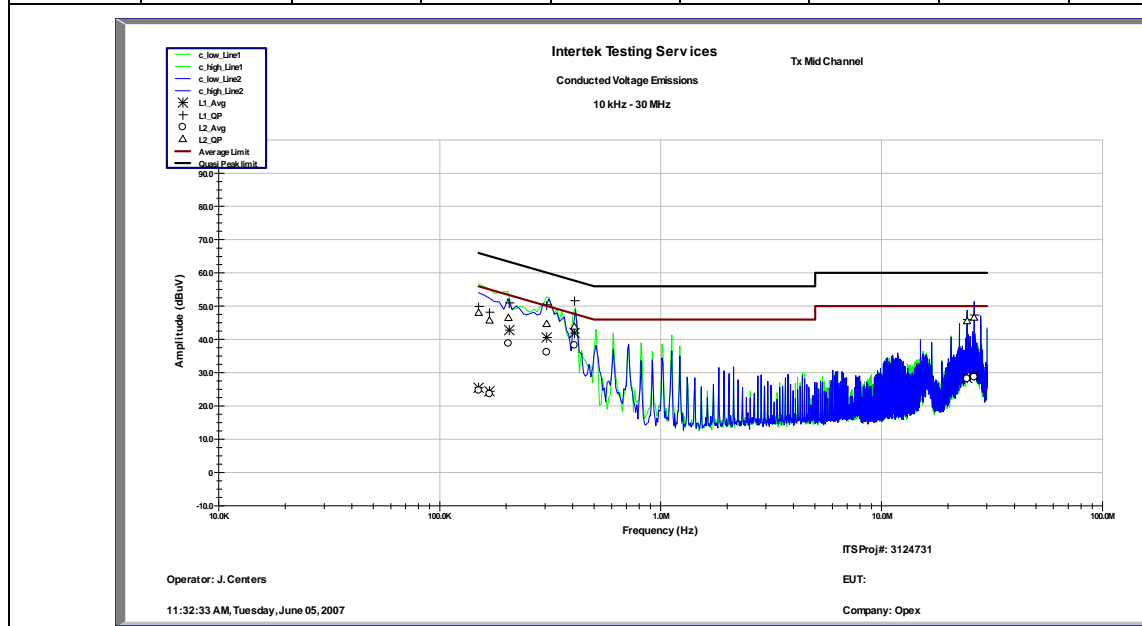


Exhibit 9

Evaluation For: Opex Incorporated  
Model No: 2033210

FCC ID: VDM2033210  
IC ID: 7175A2033210

Conducted Voltage Emissions Tabular Data (L1 & L2) – Receive Mode Channel

**Test Engineer:** Jason Centers

**Test Start Date:** 6/5/2007 **Test End Date:** 6/5/2007

**Emission Limit Tested To:** 15.207

**General Notes / Comments / Performance Monitoring Method:**

Device powered by 120VAC, 60Hz

Line	Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Delta (dB)	Average (dBuV)	Average Limit (dBuV)	Average Delta (dB)	Results
Phase	150.0 KHz	50.61	66	-15.39	25.93	56	-30.07	Compliant
Phase	168.0 KHz	48.61	65.06	-16.45	24.76	55.49	-30.73	Compliant
Phase	204.8 KHz	53.21	63.41	-10.21	44.7	54.43	-9.74	Compliant
Phase	304.7 KHz	51.04	60.11	-9.08	40.8	51.58	-10.78	Compliant
Phase	345.6 KHz	40.31	59.07	-18.76	21.7	50.41	-28.71	Compliant
Phase	407.3 KHz	52.15	57.7	-5.56	42.04	48.65	-6.61	Compliant
Neutral	150.0 KHz	48.17	66	-17.83	25.66	56	-30.34	Compliant
Neutral	168.0 KHz	46.3	65.06	-18.76	23.94	55.49	-31.55	Compliant
Neutral	205.0 KHz	46.86	63.41	-16.55	38.49	54.43	-15.94	Compliant
Neutral	304.7 KHz	46.08	60.11	-14.04	36.26	51.58	-15.32	Compliant
Neutral	339.0 KHz	40.03	59.23	-19.2	21.73	50.6	-28.87	Compliant
Neutral	407.3 KHz	44.06	57.7	-13.65	38.34	48.65	-10.31	Compliant

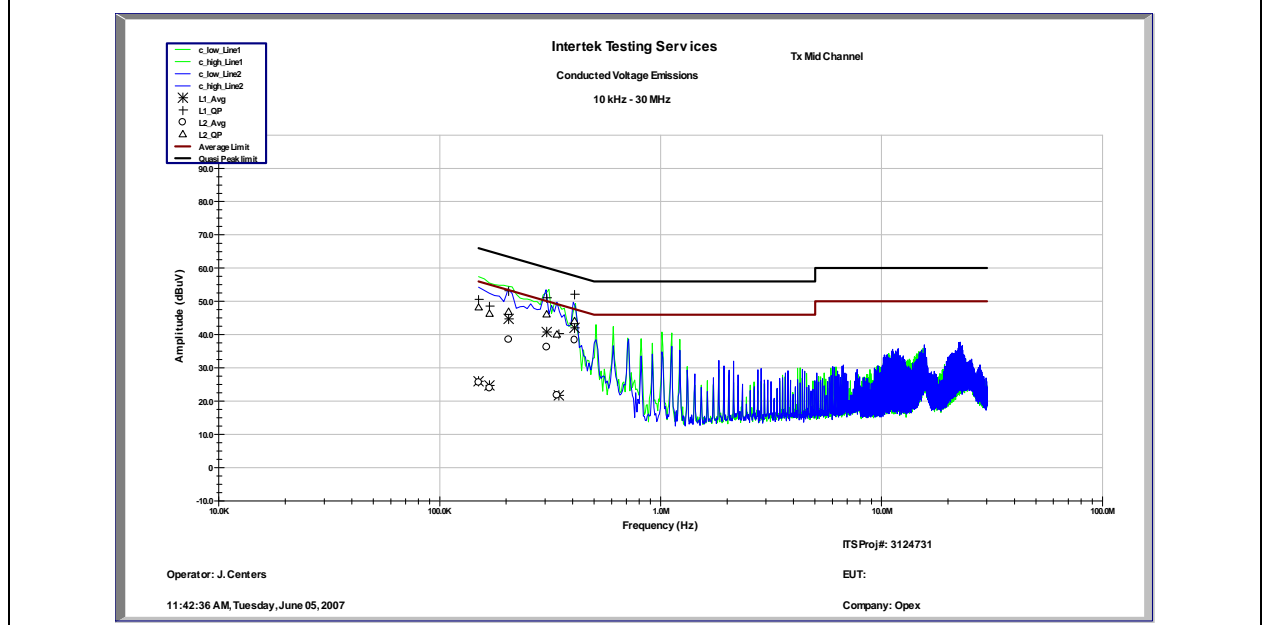


Exhibit 10