

**TEST REPORT**

**Report Number: 3130393-001**

**Project Number: 3130393**

**Evaluation of the RFID Option**

**Model: RFID-1**

**FCC ID: U70RFID1**

**FCC Part 15 Subpart C**

**RSS-210**

**For**

**Hobart Corporation**

Test Performed by:

Intertek  
731 Enterprise Drive  
Lexington, KY 40510

Test Authorized by:

Hobart Corporation  
701 South Ridge Avenue  
Troy, OH 45374

Prepared By: Jason Centers Date: 8/28/2007  
Jason Centers, Senior Project Engineer

Approved By: Bryan C. Taylor Date: 8/28/2007  
Bryan C. Taylor, Team Leader

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**Intertek**

731 Enterprise Drive, Lexington, KY 40510

Telephone: 859-226-1000 Fax: 859-226-1040 Web: [www.etlsemko.com](http://www.etlsemko.com)



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Evaluation For: Hobart Corporation  
Model No: RFID-1

FCC ID: U70RFID1  
IC ID: 7282A-RFID1

## 1 JOB DESCRIPTION

### 1.1 Company Information

Company Information	
<b>Manufacturer:</b>	Hobart Corporation
<b>Address:</b>	701 South Ridge Avenue Troy, OH 45374
<b>Contact Name:</b>	James Meyer
<b>Telephone Number:</b>	(937) 332-2432
<b>Email Address:</b>	james.meyer@hobartcorp.com

### 1.2 Test Sample Information

The Hobart Scale/Printer devices are used in food retail markets, typically at service counters such as fresh meat, seafood and deli counters, to weigh products, calculate price and print a label with UPC bar code to apply to the product. Many operators use each scale/printer in the department and it is important to keep track of transactions by operator and product information changes, such as price per pound. The Radio Frequency Identification (RFID) module option to the Scale/Printer allows the operator to be automatically signed on, to speed up the transaction time.

Test sample	
<b>Model Number:</b>	RFID-1
<b>Serial Number:</b>	Not Labeled
<b>FCC ID:</b>	U70RFID1
<b>IC ID:</b>	7282A-RFID1
<b>Device Category:</b>	Mobile
<b>RF Exposure Category:</b>	General Population/Uncontrolled Environment
<b>Transmission:</b>	FM
<b>Frequency Range (MHz)</b>	0.1342
<b>Antenna Type:</b>	loop antenna
<b>Antenna Location:</b>	Internal

### 1.3 System Support Equipment

Description	Manufacturer	Model Number
Keyboard	Slim X-Structure	OG2358
USB Mouse	Slim X-Structure	Not Labeled

## 1.4 Cables Used During Testing

Table 1-1 contains the details of the cables used during the testing.

Table 1-1: Interconnecting Cables Used During Testing

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
AC Power Cable	6 ft	None	None	AC Power Source	EUT

## 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 – RFID Module Tested Stand Alone

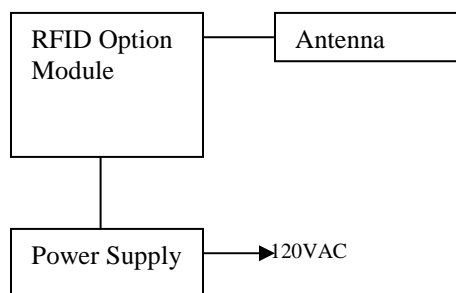
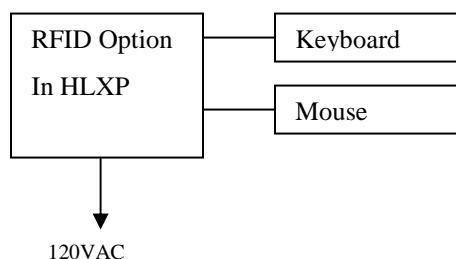


Figure 1-2: Test Configuration – RFID Module Tested In HLXP Scale



**1.6 Mode(s) of operation / Engineering Judgments**

The RFID Option was powered using a typical power supply that is used in the Hobart Corporation scales. Tests were performed with the RFID transmitting at maximum output power. The RFID Module was tested in a stand-alone configuration to obtain FCC limited modular approval. The RFID Option was also tested installed in the HLXP scale produced by Hobart Corporation. The RFID Option was previously tested in an HLX scale and was certified under FCCID: U70HLXRFID1.

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Model No: RFID-1

FCC ID: U70RFID1  
IC ID: 7282A-RFID1

## 2 EXECUTIVE SUMMARY

Testing performed for: Hobart Corporation

Equipment Under Test: RFID-1

Receipt of Test Sample: 8/3/2007

Test Start Date: 8/3/2007

Test End Date: 8/3/2007

FCC RULE	IC RULE	DESCRIPTION OF TEST	RESULT	PAGE
§15.209	RSS-210 - 2.6	Field Strength of Spurious Radiation	<b>Compliant</b>	8
§15.109	RSS-GEN – 6	Receiver Radiated Emissions	<b>NA<sup>1</sup></b>	-
§15.207, 15.107	RSS GEN – 7.2.2	Conducted Voltage Emissions	<b>Compliant</b>	12

### 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.

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<sup>1</sup> Not applicable per §15.101. Receiver operates below 30MHz.

### 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.

The Industry Canada filing number for this site is 2055A-1. The FCC registration number is 485103.



#### 3.1 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration due date
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	6/19/2008
LISN	Fischer Custom Communication	FCC-LISN-50-50-2M	1026	5/11/2008
Loop Antenna	EMCO	6502	3416	1/11/2008

## **4 FIELD STRENGTH OF SPURIOUS RADIATION**

FCC §15.209

### **4.1 Test Procedure**

- Measurements are made over the frequency range of 10 kHz to ten times the transmit frequency.
- Measurements below 30MHz were performed with a loop antenna positioned in three orthogonal axes. Only the highest measured emission from the different orientations is reported.
- From 30 to 1000 MHz, a quasi-peak detector was used for measurement. From 9–90 kHz, 110–490 kHz and above 1000 MHz, average measurements were performed.
- The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.
- The EUT was 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.
- Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.
- The test was performed transmitting 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 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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## 4.2 Test Results

The RFID Option met the field strength requirements of FCC §15.209 for the fundamental and spurious emissions. See Exhibit 1 for the measured fundamental and spurious emissions and Exhibit 2 for graphical results for the RFID Module. See Exhibit 3 for the measured fundamental and spurious emissions and Exhibit 4 for graphical results for the RFID Module installed in a HLXP scale. All other spurious emissions not shown were greater than 20dB below the limit.

Maximized Quasi Peak and Average Emissions (Sorted by Delta) – RFID Module (Stand Alone)

<b>Test Engineer:</b> Jason Centers								
<b>Test Start Date:</b> 8/3/2007 <b>Test End Date:</b> 8/3/2007								
<b>Emission Limit Tested To:</b> 15.209 <b>Test Distance (EUT to Antenna):</b> 3m								
Frequency	Cab. (dB)	Ant. (dB)	Corr. Peak Reading. (dBuV/m)	Corr. QP Reading. (dBuV/m)	Corr. AVG Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Results
134.2 KHz	0.06	12.3	95.14	93	84.5	105.1	-20.6	Compliant
401.6032 KHz	0.08	12.1	68.4	66.17	58.05	95.51	-37.46	Compliant
672.43 KHz	0.1	11.97	59.51	56.79	-	71.05	-14.26	Compliant
939.98 KHz	0.12	12.02	54.98	51.85	-	68.14	-16.29	Compliant
1.2078 MHz	0.14	11.88	50.99	47.75	-	65.96	-18.21	Compliant
1.4756 MHz	0.17	11.85	47.68	44.39	-	64.22	-19.83	Compliant
18.659 MHz	0.68	10.16	44.191	41.58	-	69.54	-27.96	Compliant
20.807 MHz	0.7	9.84	51.63	49.14	-	69.54	-20.4	Compliant

Exhibit 1

Graphical Peak Scan – RFID Module (Stand Alone)

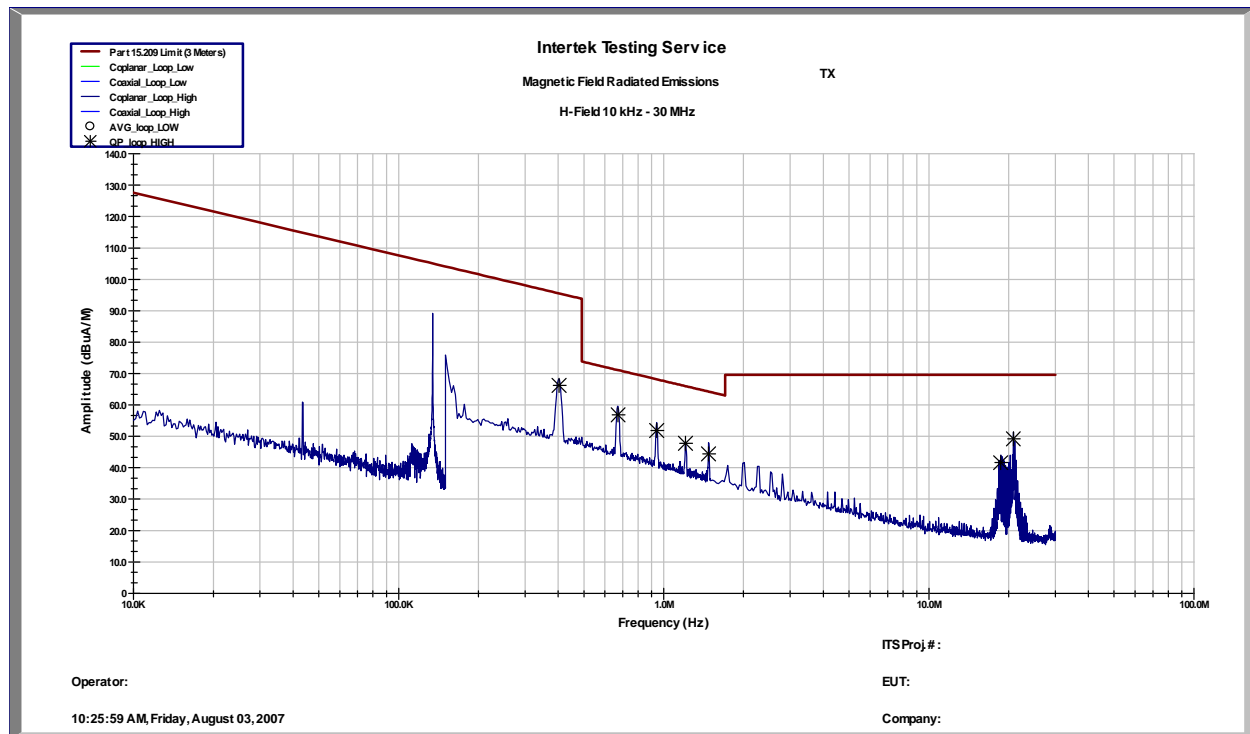


Exhibit 2

Maximized Quasi Peak and Average Emissions (Sorted by Delta) – RFID Module Installed in HLXP Scale

<b>Test Engineer:</b> Jason Centers								
<b>Test Start Date:</b> 8/3/2007 <b>Test End Date:</b> 8/3/2007								
<b>Emission Limit Tested To:</b> 15.209 <b>Test Distance (EUT to Antenna):</b> 3m								
Frequency	Cab. (dB)	Ant. (dB)	Corr. Peak Reading. (dBuV/m)	Corr. QP Reading. (dBuV/m)	Corr. AVG Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Results
134.2 KHz	0.06	12.3	97.75	95.81	85.1	105.1	-20	Compliant
400.6 KHz	0.08	12.1	68.4	60.78	58.05	95.55	-37.5	Compliant
669.43 KHz	0.1	11.97	55.95	52.35	-	71.09	-18.74	Compliant
938.98 KHz	0.12	12.02	51.46	47.49	-	68.15	-20.66	Compliant
1.2065 MHz	0.14	11.88	47.16	42.61	-	65.97	-23.36	Compliant
1.474 MHz	0.17	11.85	43.57	38.96	-	64.23	-25.27	Compliant
13.843 MHz	0.67	10.58	42.26	35.59	-	69.54	-33.95	Compliant

Exhibit 3

Evaluation For: Hobart Corporation  
Model No: RFID-1

FCC ID: U70RFID1  
IC ID: 7282A-RFID1

Graphical Peak Scan – RFID Module Installed in HXLP Scale

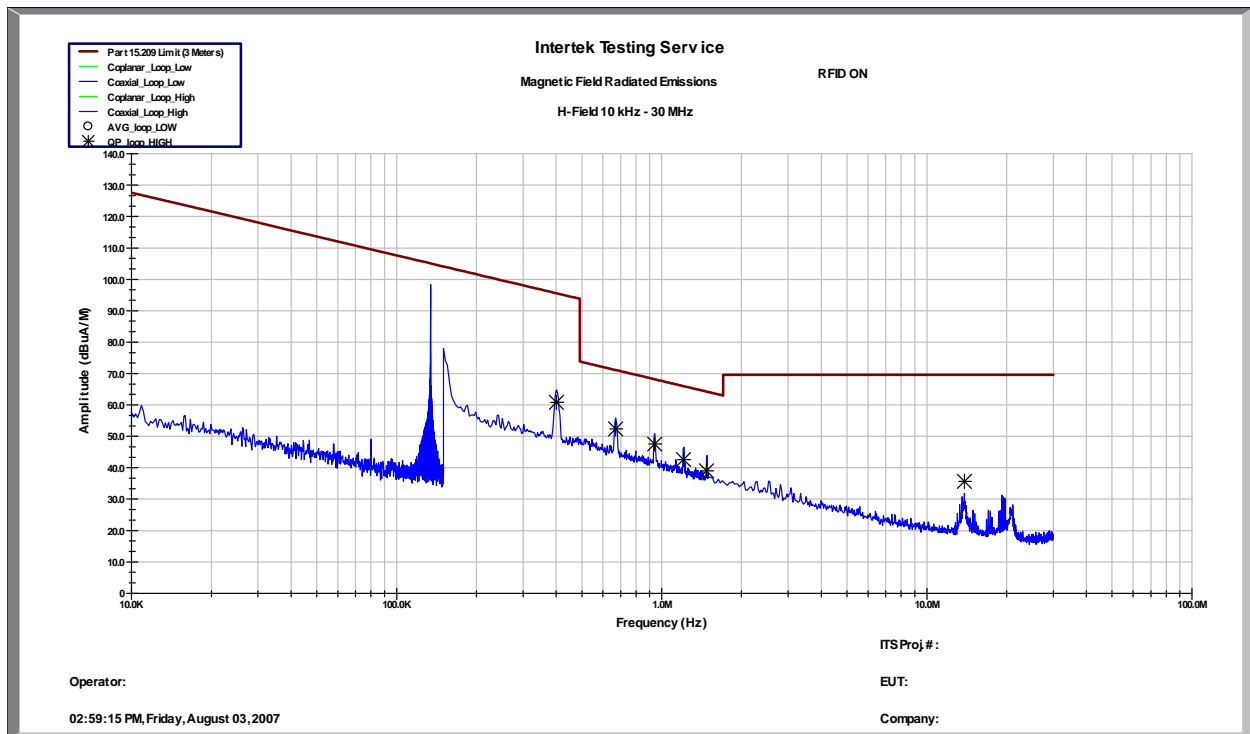


Exhibit 4

## **5 CONDUCTED VOLTAGE EMISSIONS**

FCC §15.107, §15.207

### **5.1 Test Method:**

Conducted voltage emission measurements were performed as follows:

- The RFID Option 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 RFID Option was powered. Its functions and features were exercised during the testing process, and a scan was taken.
- 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 with the transmitter operating at maximum output power.

Evaluation For: Hobart Corporation  
Model No: RFID-1

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## 5.2 Test Results:

The RFID Option was **compliant** with conducted voltage emissions requirements. No conducted voltage emissions on the AC power interface exceeded the quasi-peak or average limits. See Exhibit 5 for tabular results of conducted voltage emissions and Exhibit 6 graphical test results of the RFID Module. See Exhibit 7 for tabular results of conducted voltage emissions and Exhibit 8 graphical test results with the RFID Module installed in a HLXP scale.

Conducted Voltage Emissions Tabular Data (L1 & L2) – RFID Module

<b>Test Engineer:</b> Jason Centers <b>Test Start Date:</b> 8/3/2007 <b>Test End Date:</b> 8/3/2007 <b>Emission Limit Tested To:</b> 15.207 Limits & 15.107 Class B Limits <b>General Notes / Comments / Performance Monitoring Method:</b> 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	173.2 KHz	46.03	64.81	-18.78	37.71	54.81	-17.10	<b>Compliant</b>
Phase	384.0 KHz	42	58.19	-16.19	29.36	48.19	-18.83	<b>Compliant</b>
Phase	438.0 KHz	45.2	57.10	-11.90	29.1	47.10	-18.00	<b>Compliant</b>
Phase	483.0 KHz	46.48	56.29	-9.80	30.66	46.29	-15.62	<b>Compliant</b>
Phase	555.0 KHz	41.05	56.00	-14.95	23.64	46.00	-22.36	<b>Compliant</b>
Neutral	150.0 KHz	36	66.00	-30.00	25.82	56.00	-30.18	<b>Compliant</b>
Neutral	402.0 KHz	40.39	57.81	-17.42	27.76	47.81	-20.05	<b>Compliant</b>
Neutral	456.0 KHz	44.08	56.77	-12.68	26.94	46.77	-19.82	<b>Compliant</b>
Neutral	483.0 KHz	44.33	56.29	-11.95	28.67	46.29	-17.61	<b>Compliant</b>
Neutral	501.0 KHz	42.38	56.00	-13.62	24.75	46.00	-21.25	<b>Compliant</b>
Neutral	564.0 KHz	39.83	56.00	-16.17	26.21	46.00	-19.79	<b>Compliant</b>

Exhibit 5

Evaluation For: Hobart Corporation  
Model No: RFID-1

FCC ID: U70RFID1  
IC ID: 7282A-RFID1

Conducted Voltage Emissions Graphical Data – RFID Module

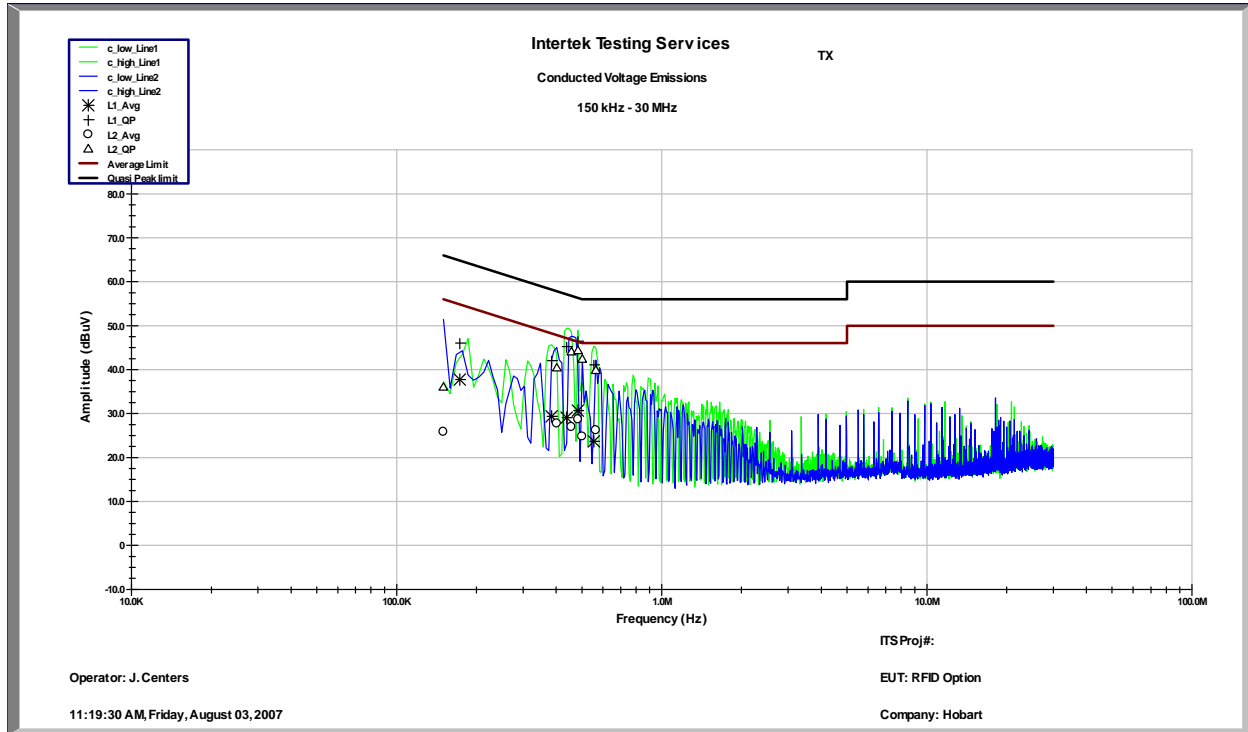


Exhibit 6

Evaluation For: Hobart Corporation  
Model No: RFID-1

FCC ID: U70RFID1  
IC ID: 7282A-RFID1

Conducted Voltage Emissions Tabular Data (L1 & L2) – RFID Module in HXLP Scale

**Test Engineer:** Jason Centers

**Test Start Date:** 8/3/2007 **Test End Date:** 8/3/2007

**Emission Limit Tested To:** 15.207 Limits & 15.107 Class B Limits

**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	49.85	66	-16.15	38.18	56	-17.82	Compliant
Phase	175.1 KHz	51.14	64.71	-13.58	44.61	54.71	-10.11	Compliant
Phase	260.2 KHz	44.23	61.43	-17.19	41.45	51.43	-9.97	Compliant
Phase	346.4 KHz	42.53	59.05	-16.52	38.25	49.05	-10.80	Compliant
Phase	482.6 KHz	45.35	56.29	-10.94	28.38	46.29	-17.91	Compliant
Phase	502.5 KHz	45.61	56.00	-10.39	36.01	46.00	-9.99	Compliant
Phase	13.289 MHz	42.65	60	-17.35	34.65	50	-15.35	Compliant
Phase	13.558 MHz	47.78	60.00	-12.22	39.55	50.00	-10.45	Compliant
Neutral	150.0 KHz	48.7	66.00	-17.30	36.96	56.00	-19.04	Compliant
Neutral	173.4 KHz	55.04	64.80	-9.75	51.45	54.80	-3.34	Compliant
Neutral	260.1 KHz	47.91	61.43	-13.51	45.38	51.43	-6.04	Compliant
Neutral	346.9 KHz	41.03	59.04	-18.01	36.66	49.04	-12.38	Compliant
Neutral	481.9 KHz	44.03	56.31	-12.27	27.68	46.31	-18.62	Compliant
Neutral	506.3 KHz	43.92	56	-12.08	33.78	46	-12.22	Compliant
Neutral	13.289 MHz	42.99	60	-17.01	34.88	50	-15.12	Compliant
Neutral	13.56 MHz	46.42	60	-13.58	38	50	-12	Compliant

Exhibit 7

Evaluation For: Hobart Corporation  
Model No: RFID-1

FCC ID: U70RFID1  
IC ID: 7282A-RFID1

Conducted Voltage Emissions Graphical Data – RFID Module in HLXP Scale

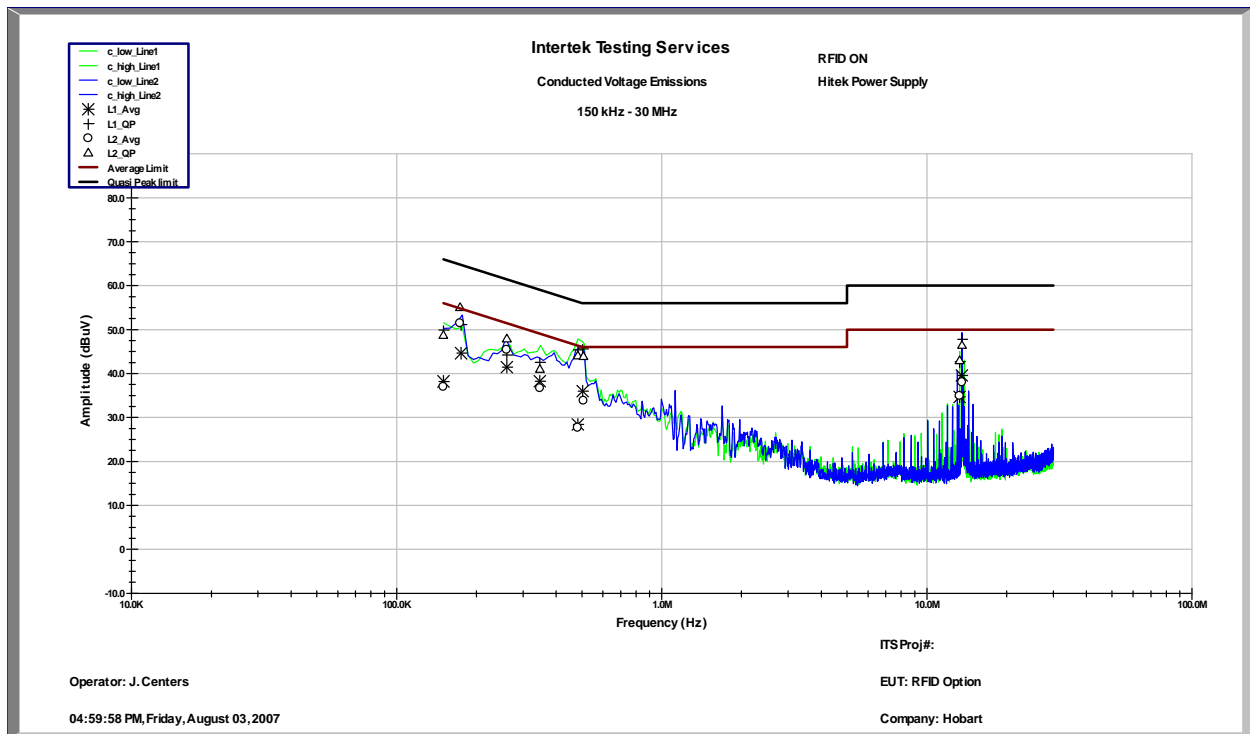


Exhibit 8