TEST REPORT

Report Number: 3116714LEX-001
Project Number: 3116714

Evaluation of the HLX-1 Scale with RFID Option
FCC ID: U70HLXRFID1

FCC Part 15 Subpart B
FCC Part 15 Subpart C

For

Hobart Corporation

Test Performed by:	Test Authorized by:
Intertek 731 Enterprise Drive Lexington, KY 40510	Hobart Corporation 701 South Ridge Avenue Troy, OH 45374

Prepared By:_____ **Date:**____4/23/2007_____

Jason Centers, Senior Project Engineer

Approved By:_____ **Date:**____4/23/2007_____

Bryan C. Taylor, Team Leader

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1 JOB DESCRIPTION

1.1 Company Information

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

1.2 Test Sample Information

The HLX Scale/Printer is 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) option to the HLX Scale/Printer allows the operator to be automatically signed on, to speed up the transaction time.

Test sample	
Model Number:	HLX-1 Scale with RFID Option
Serial Number:	Not Labeled
FCC ID:	U70HLXRFID1
Device Category:	Mobile
RF Exposure Category:	General Population/Uncontrolled Environment
Transmission:	FM
Frequency Range (MHz)	0.1342
Antenna Type:	loop antenna
Antenna Location:	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.

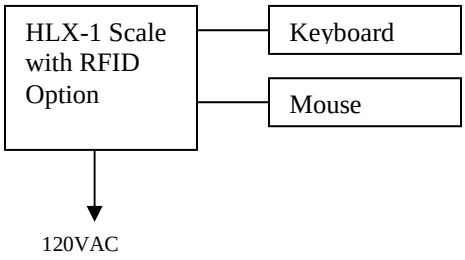
Table 1-1: Interconnecting Cables Used During Testing

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



1.6 Mode(s) of operation / Engineering Judgments

The HLX-1 Scale with RFID Option was powered by 120VAC, 60Hz. Tests were performed with the RFID transmitting at maximum output power.

2 EXECUTIVE SUMMARY

Testing performed for: Hobart Corporation

Equipment Under Test: HLX-1 Scale with RFID Option

Receipt of Test Sample: 2/15/2007

Test Start Date: 2/15/2007

Test End Date: 3/22/2007

FCC RULE	DESCRIPTION OF TEST	RESULT	PAGE
§15.209	Field Strength of Spurious Radiation	**Compliant**	7
§15.109	Receiver Radiated Emissions	**Compliant**	10
§15.207, 15.107	Conducted Voltage Emissions	**Compliant**	15

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.

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	5/9/2007
Loop Antenna	EMCO	6502	3416	1/11/2007

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 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 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 dBµV

AF = 18.52 dB

CF = 0.78 dB

FS = 19.48 + 18.52 + 0.78 = 38.78 dBµV/m

Level in µV/m = Common Antilogarithm [(38.78 dBµV/m)/20] = 86.89 µV/m

4.2 Test Results

The HLX-1 Scale with RFID Option met the field strength requirements of FCC §15.209 for the fundamental and spurious emissions. See Exhibit 1 and for the measured fundamental and spurious emissions and Exhibit 2 for graphical results. All other spurious emissions not shown below were greater than 20dB below the limit.

Maximized Quasi Peak and Average Emissions (Sorted by Delta)

Test Engineer: Jason Centers

Test Start Date: 2/15/2007 **Test End Date:** 2/15/2007

Emission Limit Tested To: 15.209 **Test Distance (EUT to Antenna):** 3m

Frequency (kHz)	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	0.1	12.3	93.02	91.2	86.1	105.1	-19	**Compliant**
403.6	0.08	12.1	66.2	65	47.2	95.49	-48.29	**Compliant**
670.1	0.1	11.97	56.33	55.51	49.51	71.08	-15.57	**Compliant**
940.98	0.12	12.02	49.9	48.35	42.18	68.13	-19.78	**Compliant**

Exhibit 1

Graphical Peak Scan

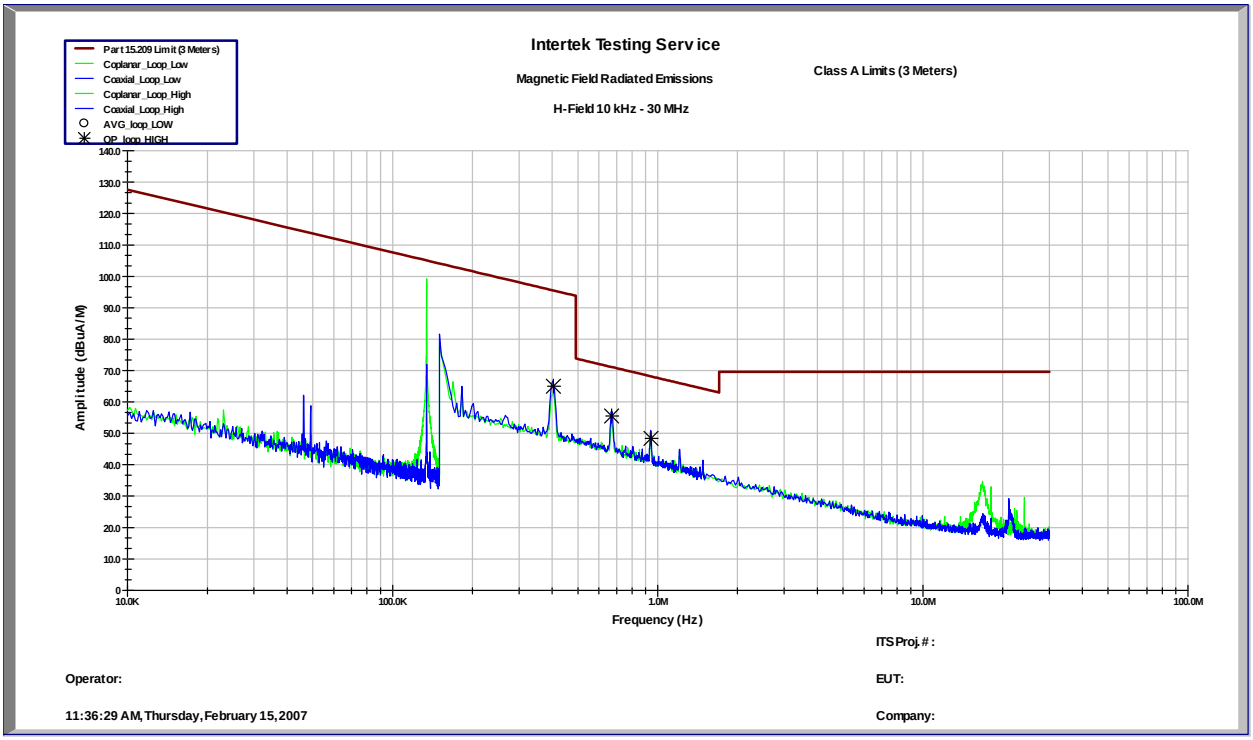


Exhibit 2

5 RADIATED RECEIVER EMISSIONS

FCC §15.109

5.1 Test Method

- 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. Photographs of the test setup are shown in Exhibit 5 and Exhibit 6.
- 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 dBµV

AF = 18.52 dB

CF = 0.78 dB

FS = 19.48 + 18.52 + 0.78 = 38.78 dBµV/m

Level in µV/m = Common Antilogarithm [(38.78 dBµV/m)/20] = 86.89 µV/m

5.2 Test Results

The HLX-1 Scale with RFID Option was **compliant** with the radiated emissions requirements of FCC §15.109 of Class A limits. The maximized radiated emissions data can be found in Exhibit 3. Graphical results are shown in Exhibit 4.

Maximized Quasi Peak and Average Emissions (Sorted by Delta)

Test Engineer: Jason Centers

Test Start Date: 2/15/2007 **Test End Date:** 2/15/2007

Emission Limit Tested To: Class A **Test Distance (EUT to Antenna):** 10m

Frequency (MHz)	Polarity (H/V)	Cab. (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Results
199.7 MHz	H	3.17	9.9	33.53	40	-6.47	**Compliant**
266.34 MHz	V	3.63	12.83	39.1	47	-7.9	**Compliant**
120.02 MHz	H	2.17	6.9	29.17	40	-10.83	**Compliant**
840.01 MHz	V	6.42	22.9	34.88	47	-12.12	**Compliant**
120.03 MHz	V	2.17	6.6	23.37	40	-16.63	**Compliant**
67.901 MHz	V	1.6	6.15	7.75	40	-32.25	**Compliant**

Exhibit 3

Graphical Peak Scan

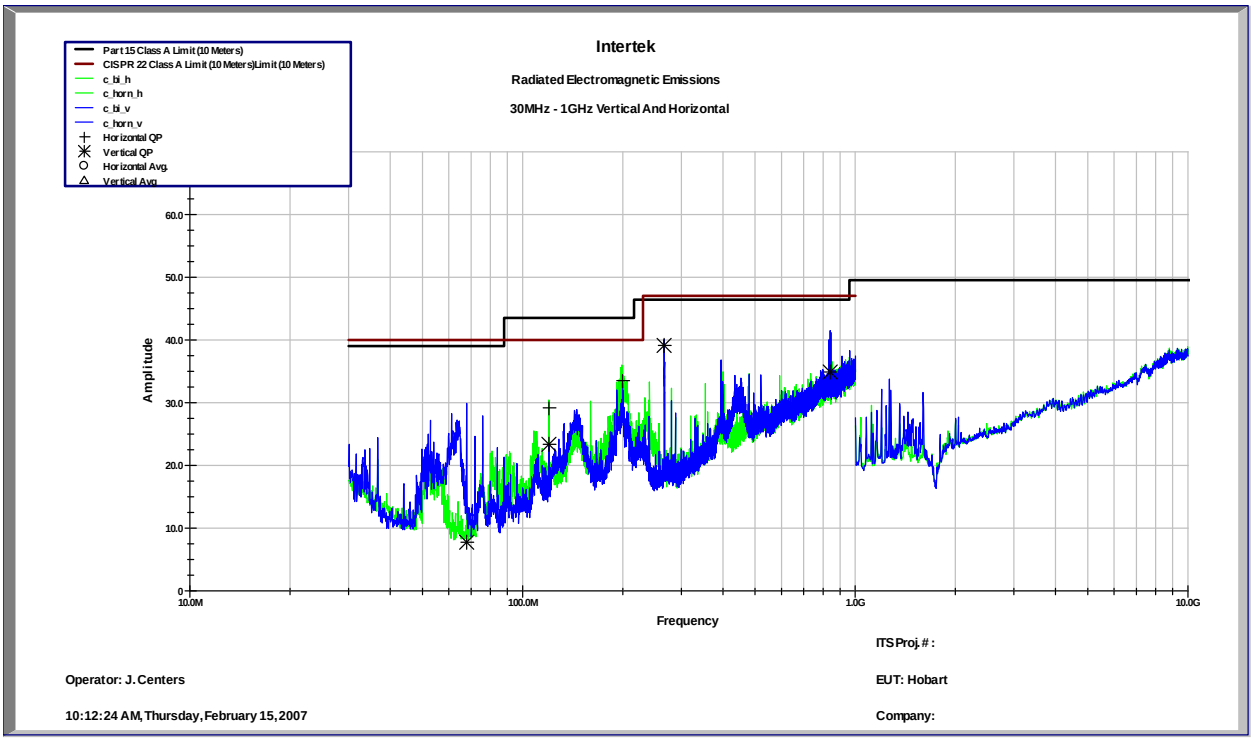


Exhibit 4

Photograph of Radiated Emissions Test Setup – Front

Exhibit 5

Photograph of Radiated Emissions Test Setup – Back

Exhibit 6

6 CONDUCTED VOLTAGE EMISSIONS

FCC §15.107, §15.207

6.1 Test Method:

Conducted voltage emission measurements were performed as follows:

- The HLX-1 Scale with 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 Ω.
- The HLX-1 Scale with 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.

6.2 Test Results:

The HLX-1 Scale with 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 7 for tabular results of conducted voltage emissions and Exhibit 8 graphical test results with the Hitek Power Supply. See Exhibit 9 for tabular results of conducted voltage emissions and Exhibit 10 graphical test results with the Power One Power Supply.

Conducted Voltage Emissions Tabular Data (L1 & L2) - Hitek Power Supply

Test Engineer: Bryan Taylor

Test Start Date: 3/22/2007 **Test End Date:** 3/22/2007

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
Line 1	2.34MHz	NA	NA	NA	36.8	46	-9.2	**Compliant**
All other conducted voltage emissions were below the limit when measured with a peak detector.								

Exhibit 7

Conducted Voltage Emissions Graphical Data – Hitek Power Supply

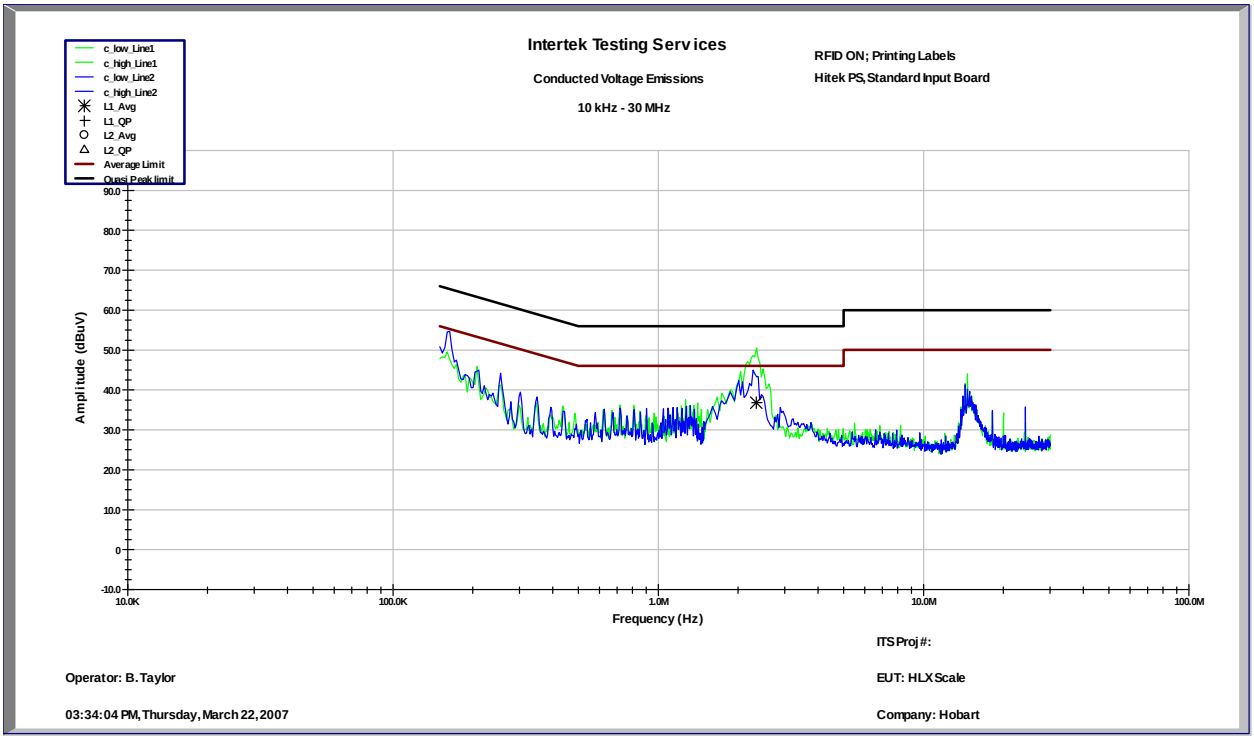


Exhibit 8

Conducted Voltage Emissions Tabular Data (L1 & L2) – Power One Power Supply

Test Engineer: Bryan Taylor

Test Start Date: 3/22/2007 **Test End Date:** 3/22/2007

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
Line 1	173.6 KHz	NA	NA	NA	54.5	55.33	-0.83	**Compliant**
Line 1	305.2 KHz	NA	NA	NA	42.1	51.57	-9.47	**Compliant**
Line 1	474.0 KHz	NA	NA	NA	31.4	46.74	-15.34	**Compliant**
Line 2	170.0 KHz	NA	NA	NA	52.8	55.43	-2.63	**Compliant**
Line 2	386.0 KHz	NA	NA	NA	33.99	49.26	-15.27	**Compliant**
Line 2	565.0 KHz	NA	NA	NA	31.93	46	-14.07	**Compliant**

Exhibit 9

Conducted Voltage Emissions Graphical Data – Power One Power Supply

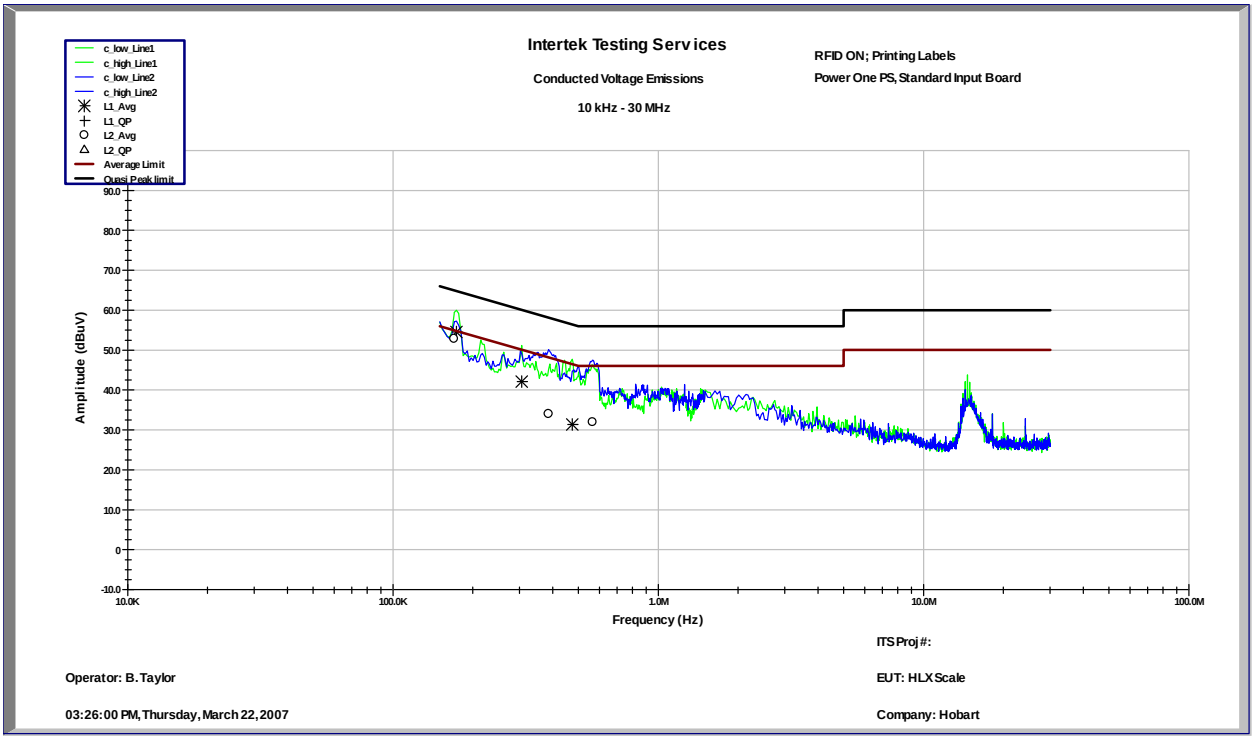


Exhibit 10

Photograph of the Conducted Voltage Emissions Test Setup – Front

Exhibit 11

Photograph of the Conducted Voltage Emissions Test Setup – Back

Exhibit 12