TEST REPORT

Report Number: 3112812LEX002
Project Number: 3112812

Evaluation of the Air Talk 900™ Wireless Lane Module
Model Number: 5031
FCC ID: UY55031AIRTALK900

FCC Part 15 Subpart B
FCC Part 15 Subpart C

For

Greyfield Industries, Inc.

Test Performed by:	Test Authorized by:
Intertek 731 Enterprise Drive Lexington, KY 40510	Greyfield Industries, Inc. 3104 Wayne Madison Road Trenton, OH 45067

Prepared By:_____ **Date:**____2/5/2007_____

Jason Centers, Senior Project Engineer

Approved By:_____ **Date:**____2/5/2007_____

Bryan C. Taylor, Team Leader

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1 JOB DESCRIPTION

1.1 Company Information

Company Information	
Manufacturer:	Greyfield Industries, Inc.
Address:	3104 Wayne Madison Road Trenton, OH 45067
Contact Name:	Brian Miller
Telephone Number:	(513) 988-9524
Email Address:	bmiller@hamiltonsafe.com

1.2 Test Sample Information

The Air Talk 900™ is a wireless, full-duplex intercom system that supports any combination of one to four 5030 wireless audio consoles communicating with one to eight 5031 wireless lane modules. Thus, the system can be as simple as one audio console communicating with one lane or as complex as four audio consoles communicating with up to eight lanes. The Air Talk 900™ contains audio processing features such as background noise cancellation, echo cancellation, and RF compression / expansion techniques. This report pertains only to the Air Talk 900™ Wireless Lane Module Model 5031.

Test sample			
Model Number:	5031		
Serial Number:	Not Labeled		
FCC ID:	UY55031AIRTALK900		
Device Category:	Mobile		
RF Exposure Category:	General Population/Uncontrolled Environment		
Transmission:	Full Duplex FM		
Frequency Range (MHz)	903-906		
Antenna Type:	½ wave center-fed dipole		
Antenna Location:	External		
Power Supply	**Manufacturer**	**Model Number**	**Serial Number**
	Terayon	AD-121ADT	Not Labeled

1.3 System Support Equipment

A Greyfield Industries, Inc. 5030 Wireless Console (FCCID: UY5 5030AirTalk900) was used to link to the Air Talk 900™ Wireless Lane Module to allow constant transmission during the evaluation.

1.4 Cables Used During Testing

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

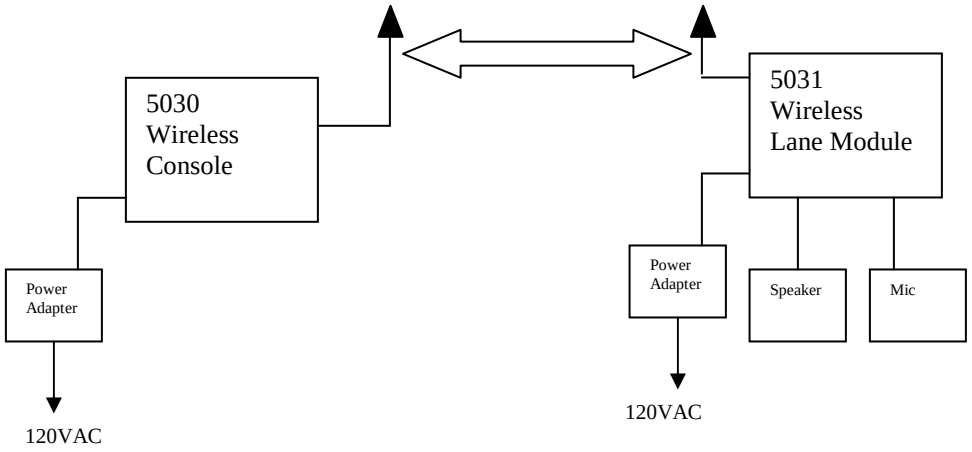
Table 1-1: Interconnecting Cables Used During Testing

Cables					
Description	**Length**	**Shielding**	**Ferrites**	**Connection**	
				From	**To**
AC Power Cable	12 ft	None	None	AC Power Source	AC Input of AC/DC Converter
Speaker Cable	10 ft.	None	None	Speaker	Air Talk 900™ Wireless Lane Module
Microphone Cable	3 ft.	None	None	Microphone	Air Talk 900™ Wireless Lane Module

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 Air Talk 900™ Wireless Lane Module was powered by the AC to DC power supply provided with the sample. Tests were performed with the wireless console transmitting on the highest and lowest channels at maximum output power.

2 EXECUTIVE SUMMARY

Testing performed for: Greyfield Industries, Inc.

Equipment Under Test: 5031

Receipt of Test Sample: 1/12/2007

Test Start Date: 1/12/2007

Test End Date: 1/31/2007

FCC RULE	DESCRIPTION OF TEST	RESULT	PAGE
§15.249, 15.209	Field Strength of Spurious Radiation	**Compliant**	8
§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.

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	5/9/2007

4 FIELD STRENGTH OF SPURIOUS RADIATION

FCC §15.209, §15.249

4.1 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 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 on the highest and lowest transmitting frequencies at maximum output power.

4.2 Test Results

The Air Talk 900™ Wireless Lane Module 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 – Low Channel

Frequency (MHz)	Polarity (H/V)	Analyzer Reading (dBuV/m)	Cable/Pre-amp (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Results	Comment
903.0 MHz	V	65.33	4.6	22.26	92.19	94	-1.81	**Compliant**	Fundamental
903.0 MHz	H	60.46	4.6	23.44	88.5	94	-5.5	**Compliant**	Fundamental
2.709 GHz	H	55.88	-35.41	29.1	49.57	53.98	-4.41	**Compliant**	
33.2 MHz	V	15.97	0.76	13.69	30.42	40	-9.58	**Compliant**	
495.25 MHz	V	13.73	3.36	17.7	34.79	46.02	-11.23	**Compliant**	
2.709 GHz	V	52.84	-35.41	29.1	46.53	53.98	-7.45	**Compliant**	

Table 4-2: Field Strength of Spurious Radiation – High Channel

Frequency (MHz)	Polarity (H/V)	Analyzer Reading (dBuV/m)	Cable/Pre-amp (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Results	Comment
905.85 MHz	V	64.1	4.66	22.32	91.08	94	-2.92	**Compliant**	Fundamental
905.85 MHz	H	61.52	4.66	23.4	89.58	94	-4.42	**Compliant**	Fundamental
2.7175 GHz	H	51.35	-35.18	29.1	45.27	53.98	-8.71	**Compliant**	
33.197 MHz	V	14.8	0.76	13.69	29.25	40	-10.75	**Compliant**	
495.25 MHz	V	15.42	3.36	17.69	36.47	46.02	-9.55	**Compliant**	
2.7176 GHz	V	43.73	-35.17	29.1	37.66	53.98	-16.32	**Compliant**	

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 3 and Exhibit 4.

5.2 Test Results

The Air Talk 900™ Wireless Lane Module 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 1. Graphical results are shown in Exhibit 2.

Maximized Quasi Peak and Average Emissions (Sorted by Delta)

Test Engineer: Jason Centers

Test Start Date: 1/31/2007 **Test End Date:** 1/31/2007

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

Frequency (MHz)	Polarity (H/V)	Analyzer Reading (dBuV/m)	Cable/Pre-amp (dB)	Ant. (dB)	Corr. Reading. (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Results
1.8506 GHz	H	57.8	-36.4	26.91	48.31	54	-5.69	**Compliant**
1.8507 GHz	V	53.69	-36.4	27.11	44.4	54	-9.6	**Compliant**
801.83 MHz	H	9.48	4.35	22.04	35.87	46	-10.13	**Compliant**
33.195 MHz	V	15.25	0.76	13.7	29.71	40	-10.29	**Compliant**
495.29 MHz	V	8.58	3.36	17.69	29.63	46	-16.37	**Compliant**
160	V	12.7	1.9	10	24.6	43.52	-18.92	**Compliant**

Exhibit 1

Graphical Peak Scan

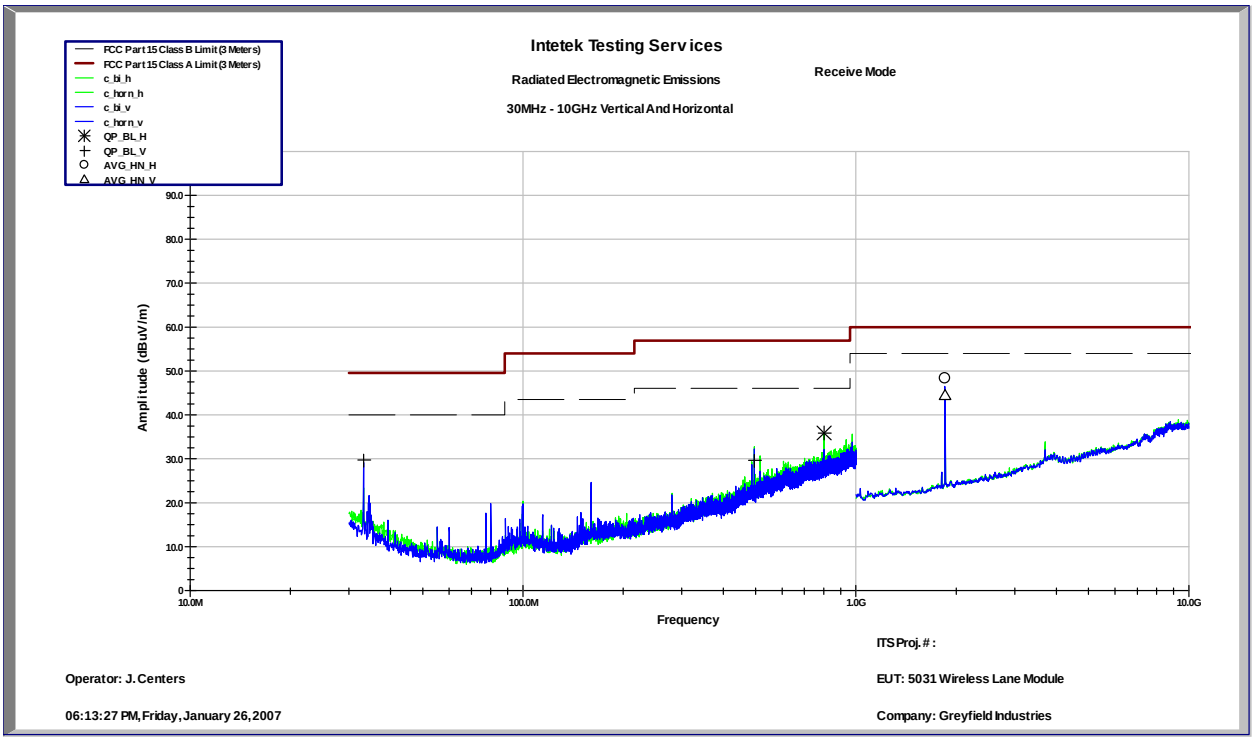


Exhibit 2

Photograph of Radiated Emissions Test Setup – Front

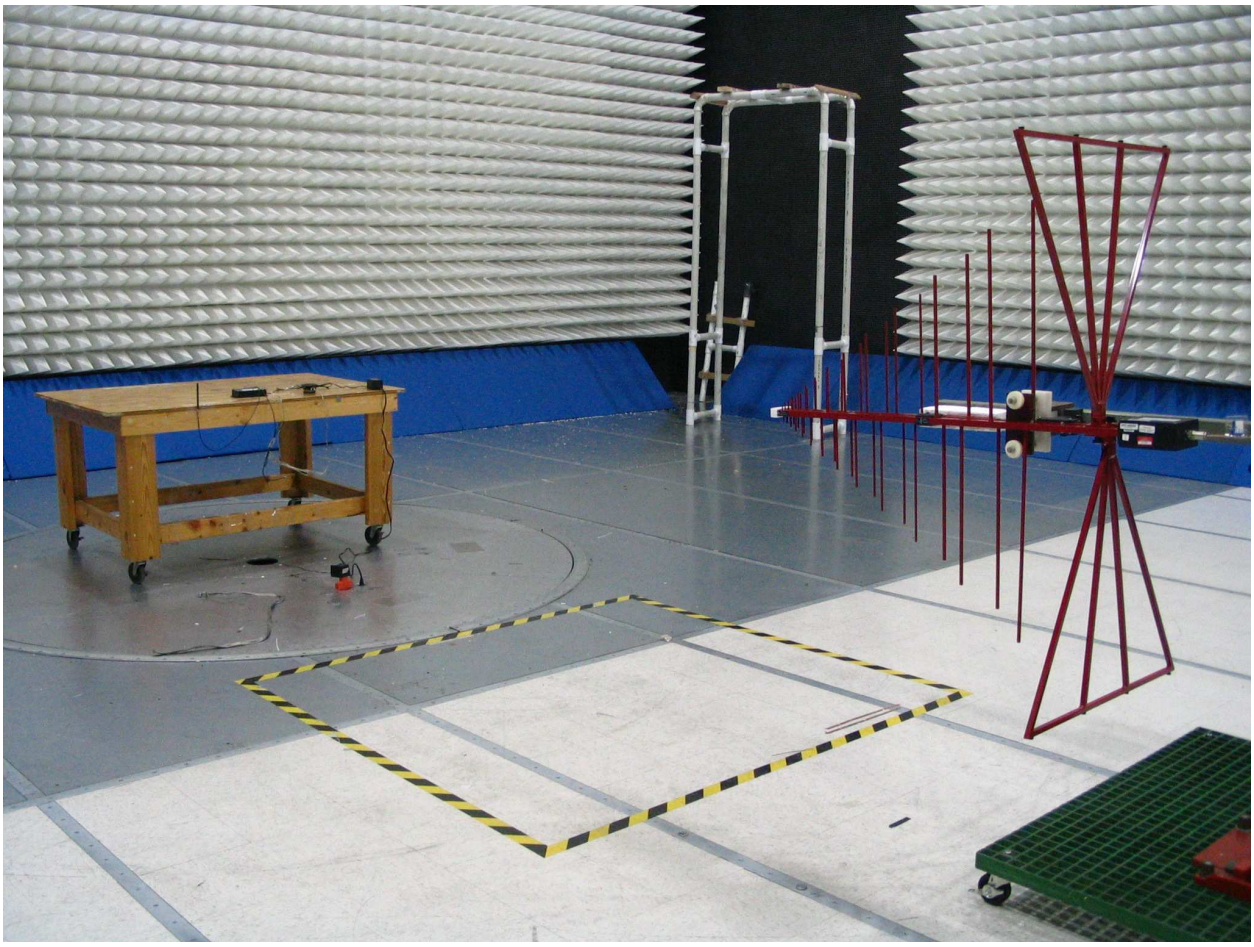


Exhibit 3

Photograph of Radiated Emissions Test Setup – Back

Exhibit 4

6 CONDUCTED VOLTAGE EMISSIONS

FCC §15.107, §15.207

6.1 Test Method:

Conducted voltage emission measurements were performed as follows:

- The Air Talk 900™ Wireless Lane Module 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 Air Talk 900™ Wireless Lane Module 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 on the highest and lowest transmitting frequencies at maximum output power and in receive mode.

6.2 Test Results:

The Air Talk 900™ Wireless Lane Module was **compliant** with conducted voltage emissions requirements for Class B limits. 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 through Exhibit 8 graphical test results.

Conducted Voltage Emissions Tabular Data (L1 & L2)

Test Engineer: Jason Centers **Test Start Date:** 3/1/2007 **Test End Date:** 3/1/2007 **Emission Limit Tested To:** Class B **General Notes / Comments / Performance Monitoring Method:** Device powered by 120VAC, 60Hz
All emissions were greater than 10dB below the Class B limit when measured with the specified detector.

Exhibit 5

Conducted Voltage Emissions Graphical Data – Receive Mode

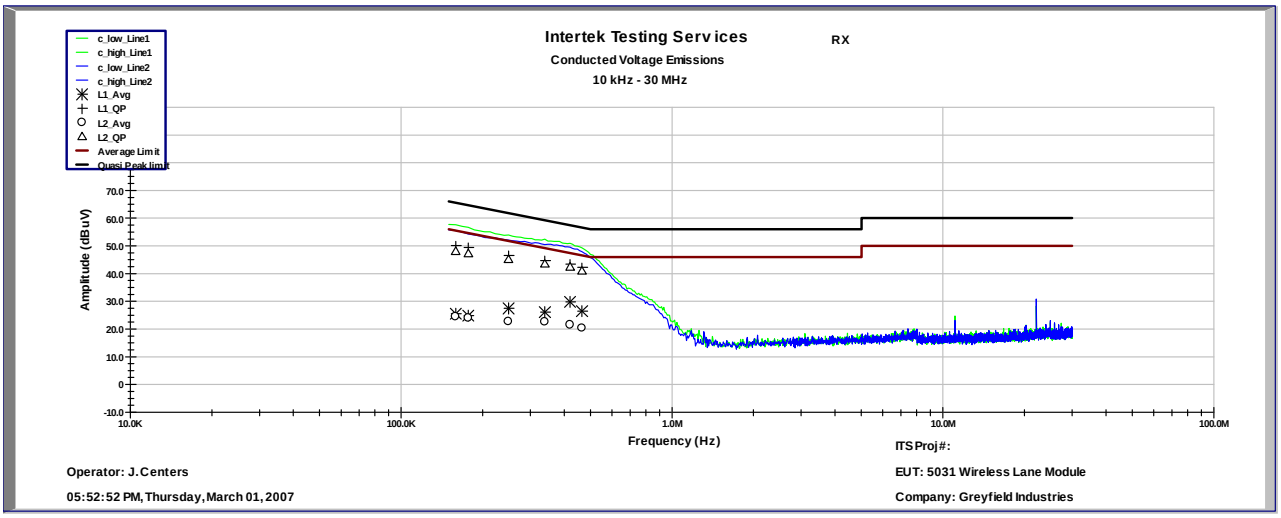


Exhibit 6

Conducted Voltage Emissions Graphical Data – Low Channel

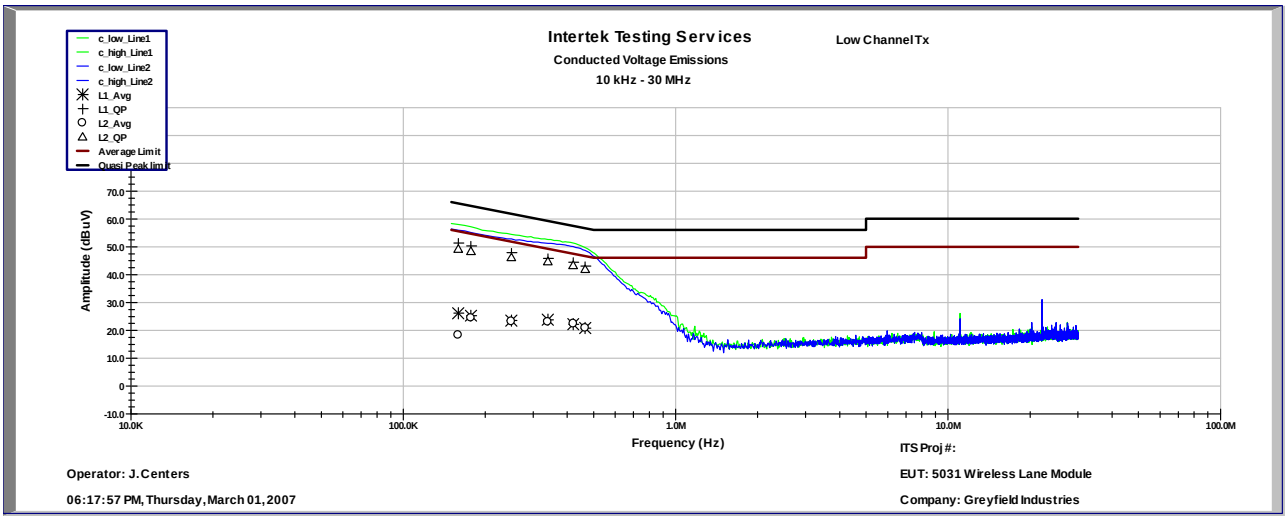


Exhibit 7

Evaluation For:Greyfield Industries, Inc. FCC ID: UY55031AIRTALK900
Model No: 5031

Conducted Voltage Emissions Graphical Data – High Channel

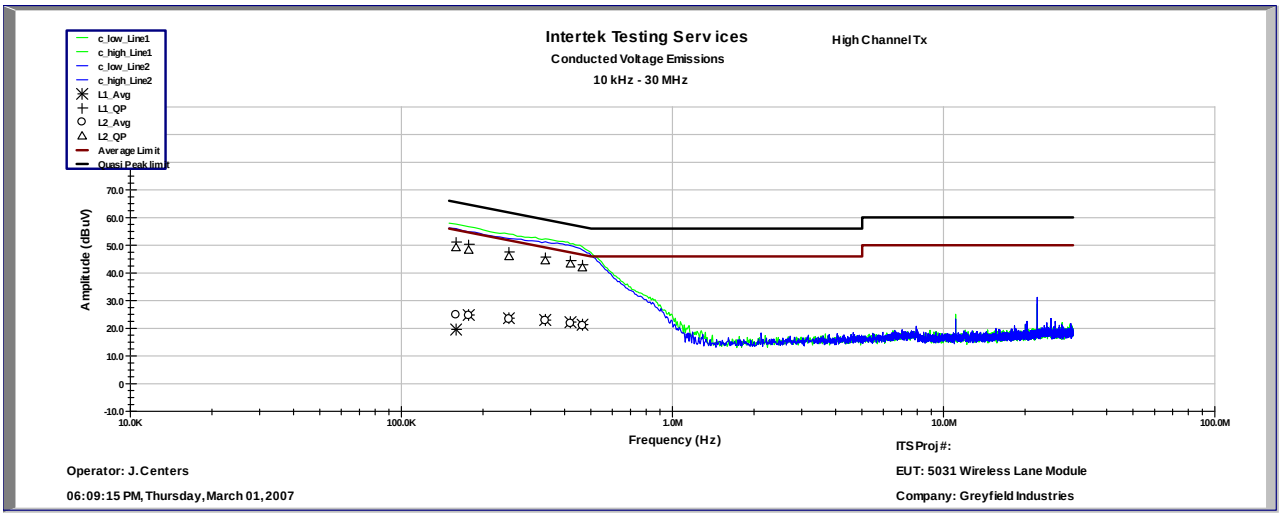


Exhibit 8

Photograph of the Conducted Voltage Emissions Test Setup – Front

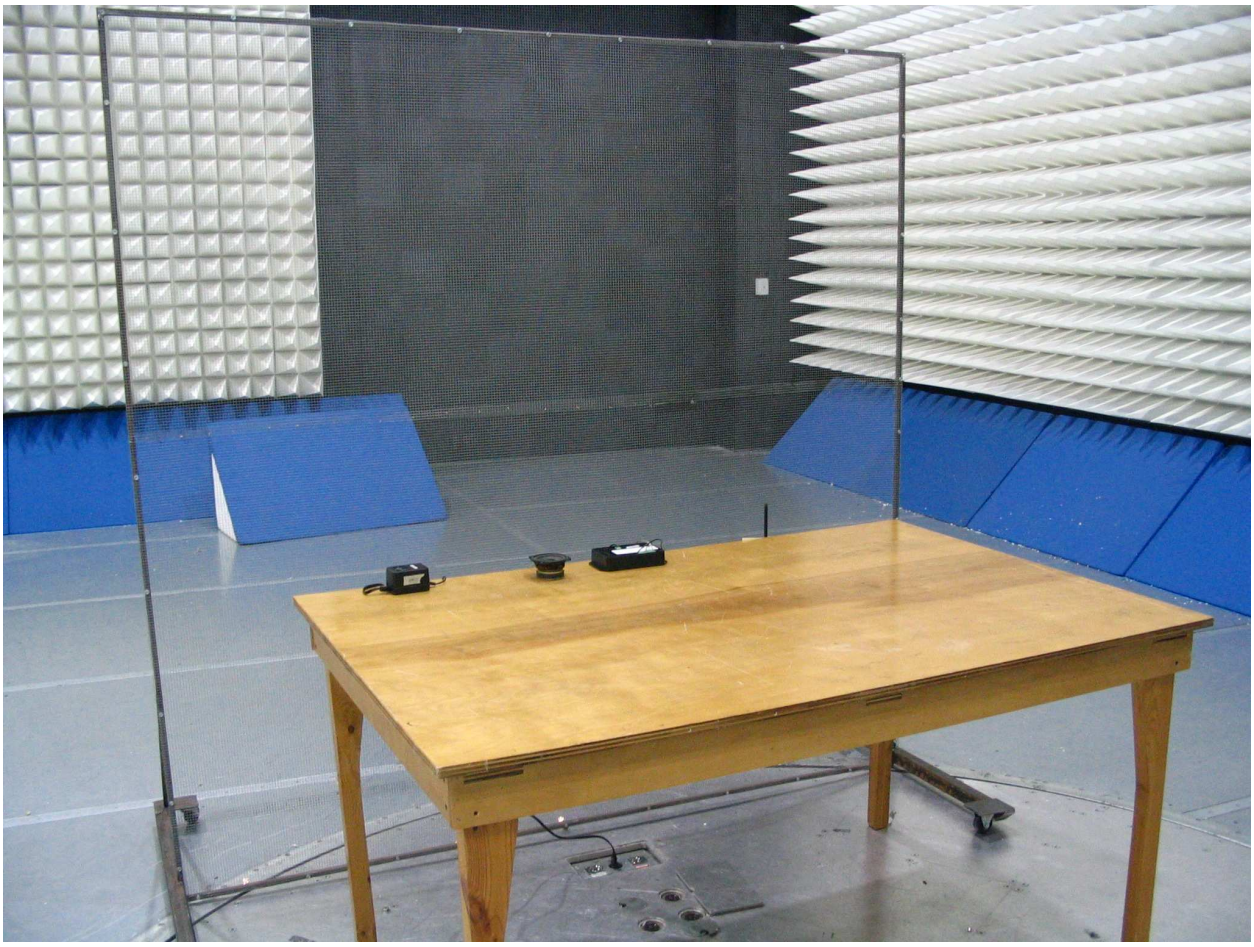


Exhibit 9

Photograph of the Conducted Voltage Emissions Test Setup – Back

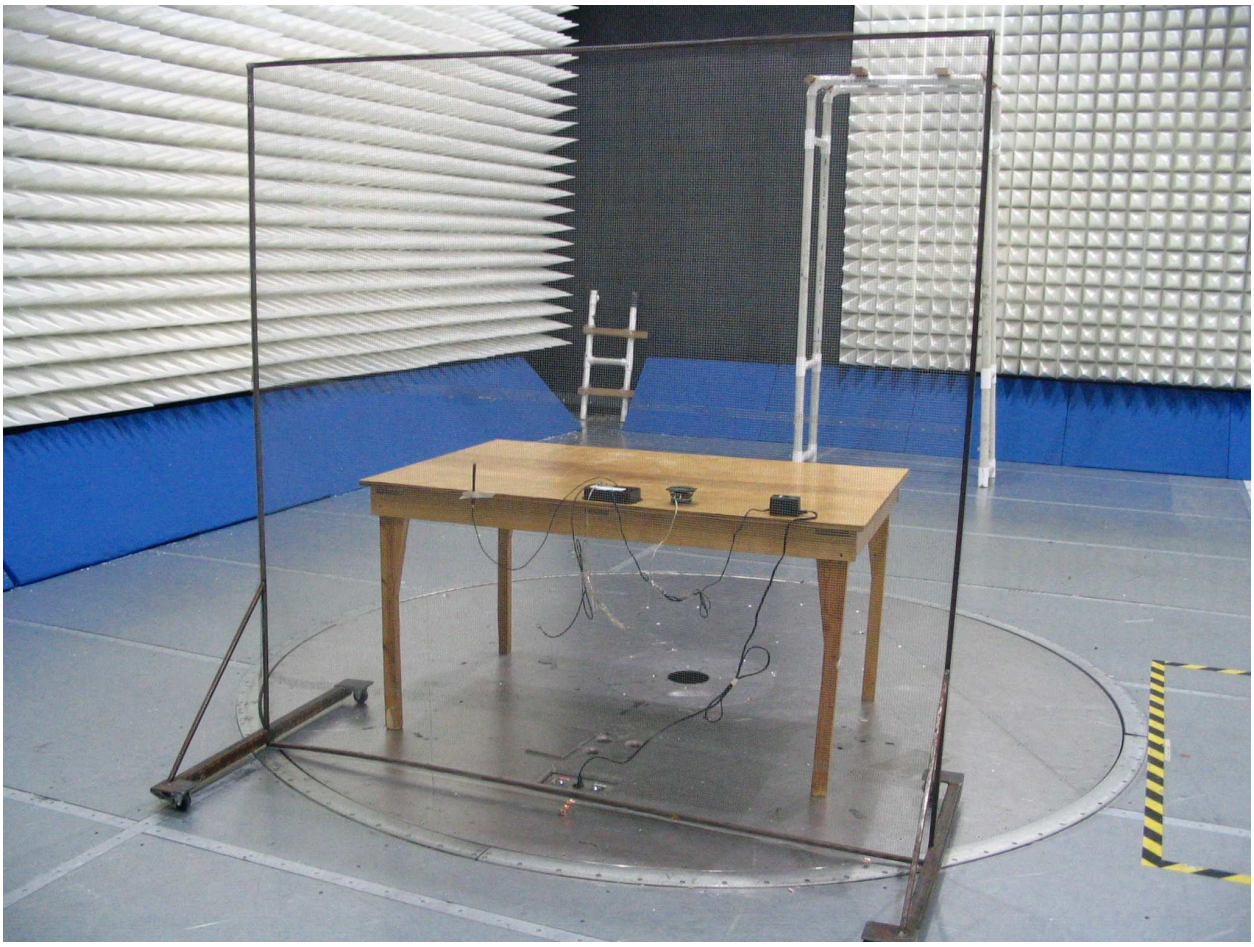


Exhibit 10