L.S. Compliance, Inc.
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Cedarburg, WI 53012
262-375-4400 Fax: 262-375-4248

COMPLIANCE TESTING OF:
UVAC

PREPARED FOR:

I.D. Systems, Inc.
Attn.: Mr. Leonard Pimentel
One University Plaza Drive
Suite 600
Hackensack, NJ 07601

TEST REPORT NUMBER:

304490 TX TCB Rev. 1

TEST DATE(S):

December 30th, 2004 and January 10th & December 17th, 2005

Table of Contents

1. L. S. Compliance In Review

L.S. Compliance - Accreditations and Listing's

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025 : 1999
with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: 1255.01

Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948
FCC Registration Number: 90756

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-212 – Issue 1
File Number: IC 3088-A

On file, 3 and 10 Meter OATS based on RSS-212 – Issue 1
File Number: IC 3088

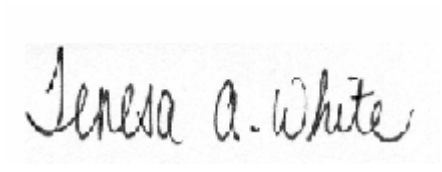
U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a U. S. Competent Body operating under the U. S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2)
Date of Validation: January 16, 2001

Validated by the European Commission as a U.S. Notified Body operating under the U.S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.

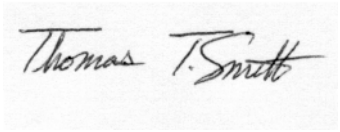
Date of Validation: November 20, 2002
Notified Body Identification Number: 1243

2. Signature Page



Prepared By: March 30, 2006

Teresa A. White, Document Coordinator Date



Tested By: April 6, 2006

Thomas T. Smith, EMC Engineer Date

Tested By: April 6, 2006

Abtin Spantman, EMC Engineer Date

Approved By: April 6, 2006

Brian E. Petted, VP of Engineering Date

3. Product and General Information

Manufacturer:	I.D. Systems, Inc.					
Date(s) of Test:	Dec. 30th, 2004 and Jan. 10th & Dec. 17th, 2005					
Test Engineer(s):	√	Tom Smith	√	Abtin Spantman		Ken Boston
Model #:	UVAC					
Serial #:	(s)04-V1360058-FLX					
Voltage:	+6.4 VDC					
Operation Mode:	Continuous Data Modulation					

4. Introduction

On **Dec. 30th, 2004 and Jan. 10th & Dec. 17th, 2005** a series of Conducted and Radiated Emission tests were performed on one sample of the **I.D. Systems, Inc. UVAC**, Serial Number ***(s)04-V1360058-FLX*****,** here forth referred to as the "*Equipment Under Test*" or "*EUT*". These tests were performed using the procedures outlined in ANSI C63.4-2003 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.249 (Industry Canada RSS-210) for a low power transmitter. These tests were performed by Thomas T. Smith, EMC Engineer and Abtin Spantman, EMC Engineer of L.S. Compliance, Inc. and witnessed by Leonard Pimentel of I. D. Systems, Inc.

All Radiated and Conducted Emission tests were performed upon the EUT to measure the emissions in the frequency bands described in FCC Title 47 CFR Part 15, including 15.35, 15.209, 15.249 and Industry Canada RSS-210 to determine whether these emissions are below the limits expressed within the standards. These tests were performed in accordance with the procedures described in the American National Standard for methods of measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2003). Another document used as a reference for the EMI Receiver specification was the Comite International Special Des Perturbations Radioelelectriques (CISPR) Number 16-1, 2003.

5. Product Description

The device is a half-duplex, fully functional fixed unit, mounted on a forklift or other ground support equipment trucks for vehicle monitoring and asset location. The transceiver operates in the 902-928 MHz spectrum. The radio is by default in receiver mode. The unit can operate in a continuous transmission mode via the user interface. The operator can return the radio to receiver mode through the user interface or by recycling the power.

6. Test Requirements

The above mentioned tests were performed in order to determine the compliance of the UVAC with limits contained in various provisions of Title 47 CFR, FCC Part 15, including:

15.31	15.205
15.33	15.207
15.35	15.209
15.37	15.249

7. Summary of Test Report

DECLARATION OF CONFORMITY

The I. D. Systems, Inc. UVAC was found to **MEET** the requirements as described within the specification of Title 47 CFR FCC, Part 15.249, Subpart (a); and Industry Canada RSS-210, Section 6.2 for a *'Non-Momentarily Operated Transmitting Device'*.

Some emissions are seen to be within 3dB of their respective limits. As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

The enclosed test results pertain to the sample(s) of the test item listed, and only for the tests performed on the data sheets. Any subsequent modification or changes to the test items could invalidate the data contained herein, and could therefore invalidate the findings of this report.

8. Radiated Emissions Test

Test Setup

The test setup was assembled in accordance with Title 47, CRF FCC Part 15 and ANSI C63.4-2003. The EUT was placed on an 80cm high non-conductive pedestal centered on a flush mounted 2-meter diameter turntable inside the 3 Meter Semi-Anechoic, FCC listed Chamber located at L. S. Compliance, Inc., Cedarburg, Wisconsin. The EUT was operated in modulated continuous transmit mode, and final testing was performed using modulated continuous transmit mode, using power as provided by a bench DC supply. The unit has the capability to operate on channels #2 - #43, controllable via user interface push buttons. The applicable limits apply at a 3 meter distance, and are found in Section 15.249. Measurements above 5 GHz were performed at a 1.0 meter separation distance. The calculations to determine these limits are detailed in the following pages. Please refer to Appendix A for a list of the test equipment. The test sample was operated on one of three (3) standard channels: low (902.6 MHz), medium (915.2 MHz) and high (927.2 MHz) to comply with FCC Part 15.35. The channels and operating modes were changed using a push button selections in the user interface.

Test Procedure

Radiated RF measurements were performed on the EUT in the 3 Meter Semi-Anechoic, FCC listed Chamber, located at L. S. Compliance, Inc. in Cedarburg, Wisconsin. The frequency range from 30 MHz to 10,000 MHz was scanned and investigated. The radiated RF emission levels were manually noted at the various fixed degree settings of azimuth on the turntable and antenna height. The EUT was placed on the non-conductive pedestal in the 3 Meter Semi-Anechoic Chamber, with the antenna mast placed such that the antenna was 3 meters from the EUT. A Biconical Antenna was used to measure emissions from 30 MHz to 300 MHz, and a Log Periodic Antenna was used to measure emissions from 300 MHz to 1000 MHz. A Double Ridged Waveguide Horn Antenna was used from 1 GHz to 18 GHz. The maximum radiated RF emissions were found by raising and lowering the antenna between 1 and 4 meters in height, using both horizontal and vertical antenna polarities.

Test Equipment Utilized

A list of the test equipment and antennas utilized for the Radiated Emissions test can be found in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. All calibrations of the antennas used were performed at an N.I.S.T. traceable site. In addition, the Connecting Cables were measured for losses using a calibrated Signal Generator and a HP 8546A EMI Receiver. The resulting correction factors and the cable loss factors from these calibrations were entered into the HP 8546A EMI Receiver database. As a result, the data taken from the HP 8546A EMI Receiver accounts for the antenna correction factor as well as cable loss or other corrections, and can therefore be entered into the database as a corrected meter reading. The HP 8546A EMI Receiver was operated with a resolution bandwidth of 120 kHz for measurements below 1 GHz (video bandwidth of 300 kHz), and a bandwidth of 1 MHz for measurements above 1 GHz (video bandwidth of 1 MHz). From 5 GHz to 10 GHz, an HP E4407 Spectrum Analyzer and an EMCO Horn Antenna were used.

Test Results

The EUT was found to **MEET** the Radiated Emissions requirements of Title 47 CFR, FCC Part 15.249 for a transmitter (Canada RSS-210). The frequencies with significant signals were recorded and plotted as shown in the Data Charts and Graphs.

CALCULATION OF RADIATED EMISSIONS LIMITS:

Field Strength of Fundamental Frequencies:

The fundamental emissions for an intentional radiator in the 902-928 MHz band, operating under FCC part 15.249 limits, must have electric field strength of no greater than 50 mV/m, for the fundamental frequency, when measured at 3 meters, and harmonic field strength of no greater than 500 μV/m, when measured at 3 meters. Spurious emissions outside the 902-928 MHz band shall be attenuated by at least 50 dB below the level of the fundamental, or meet the limits expressed in FCC part 15.209 under general emission limits.

Field Strength of Fundamental Frequencies is Limited to 50,000 μV/m, or 94 dBμV/m.

Field Strength of Harmonic and Spurious Frequencies is Limited by FCC 15.249(c)

The harmonic limit of –50 dBc with respect to the fundamental limit would be:

94 dBμV/m – 50 dB = 44 dBμV/m,

with the exception of where FCC 15.209 allows for a higher limit to be used.

Frequency (MHz)	3 m Limit (μV/m)	3 m Limit (dBμV/m)
902-928	50,000	94.0
30-88 ; 88-216	159	44.0
216-902 ; 928-960	500	46.0*
960-40,000	500	54.0*

The following table depicts the general radiated emission limits obtained from Title 47 CFR, part 15.209a, for radiated emissions measurements, including restricted band limits as expressed in 47 CFR, part 15.205.

Frequency (MHz)	3 m Limit (μV/m)	3 m Limit (dBμV/m)
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
960-40,000	500	54.0

Sample conversion from field strength μV/m to dBμV/m:

$dB\mu V/m = 20 \log_{10}$ (3m limit)

from 30 - 88 MHz for example: $dB\mu V/m = 20 \log_{10} (100)$

$40.0\ dB\mu V/m = 20 \log_{10} (100)$

For measurements made at 1 meter, a 9.5 dB correction may be been invoked.

960 MHz to 40,000 MHz

500 μV/m or 54.0 dBμV/m at 3 meters

54.0 + 9.5 = 63.5 dBμV/m at 1 meter

Note: Limits are conservatively rounded to the nearest tenth of a whole number.

Summary of Results and Conclusions

Based on the procedures outlined in this report, and the test results, it can be determined that the EUT does MEET the emission requirements of Title 47 CFR, FCC Part 15.249, for a frequency modulated transmitter.

The enclosed test results pertain to the samples of the test item listed, and only for the tests performed per the data sheets. Any subsequent modification or changes to the test items could invalidate the data contained herein, and could therefore invalidate the findings of this report.

Radiated Emissions Data Chart

3 Meter Measurements of Electromagnetic Radiated Emissions

Test Standard: Title 47 CFR 15.249

Frequency Range Inspected: 30 MHz to 10,000 MHz

Manufacturer:	I.D. Systems, Inc.						
Date(s) of Test:	Dec. 30th, 2004 and Jan. 10th, 2005						
Test Engineer(s):	√	Tom Smith	√	Abtin Spantman		Ken Boston	
Model #:	UVAC						
Serial #:	(s)04-V1360058-FLX						
Voltage:	+6.4 VDC						
Operation Mode:	Continuous Data Modulation						
EUT Power:		Single Phase ___VAC		3 Phase ___VAC			
		Battery	√	Other: Bench power supply +6.4 VDC			
EUT Placement:	√	80cm non-conductive table		10cm Spacers			
EUT Test Location:	√	3 Meter Semi-Anechoic FCC Listed Chamber		3/10m OATS			
Measurements:		Pre-Compliance		Preliminary	√	Final	
Detectors Used:		Peak	√	Quasi-Peak	√	Average	

Environmental Conditions in the Lab:
Temperature: 20 – 25°C
Relative Humidity: 30 – 60 %

Test Equipment Used:
EMI Measurement Instrument: HP8546A and Agilent E4407B
Log Periodic Antenna: EMCO #93146
Horn Antenna: EMCO #3115
Biconical Antenna: EMCO 93110
Pre-Amp: Advanced Microwave WHA6224
Standard Gain Horn: EMCO 3160-09

The following table depicts the level of significant radiated emissions found:

Frequency (MHz)	Antenna Polarity	Channel	Height (meters)	Azimuth (0° - 360°)	EMI Meter Reading (dBμV/m)	15.249 Limit (dBμV/m)	Margin (dB)
312.0	H	2	1.5	170	41.2	46.0	4.8
324.6	H	2	1.1	150	40.6	46.0	5.4
558.5	H	2	1.4	45	38.1	46.0	7.9
585.0	H	2	1.4	45	40.1	46.0	5.9
901.1	H	2	1.0	30	32.0	46.0	14.0
321.1	H	23	1.0	150	41.3	46.0	4.7
928.0	V	43	1.0	50	36.0	46.0	10.0
966.2	V	43	1.0	195	40.6	54.0	13.4
65.0	V	2	1.0	15	37.7	40.0	2.3
75.0	V	2	1.0	155	35.1	40.0	4.9

Notes:

1) A Quasi-Peak Detector was used in measurements below 1 GHz, and a Peak as well as an Average Detector was used in measurements above 1 GHz. Only the results from the Average detector are published in the table above. The peak detector was used to ensure the peak emissions did not exceed 20 dB above the limits as discussed in FCC Part 15.35(b).
2) Measurements above 5 GHz were made at 1 meters of separation from the EUT.

Radiated Emissions Data Chart

3 Meter Measurements of Electromagnetic Radiated Emissions

Test Standard: Title 47 CFR 15.249

Frequency Range Inspected: 30 MHz to 10,000 MHz

Manufacturer:	I.D. Systems, Inc.							
Date(s) of Test:	Dec. 30th, 2004 and Jan. 10th, 2005							
Test Engineer(s):	√	Tom Smith	√	Abtin Spantman		Ken Boston		
Model #:	UVAC							
Serial #:	(s)04-V1360058-FLX							
Voltage:	+6.4 VDC							
Operation Mode:	Continuous Data Modulation							
EUT Power:		Single Phase ___VAC				3 Phase ___VAC		
		Battery			√	Other: Bench power supply +6.4 VDC		
EUT Placement:	√	80cm non-conductive table				10cm Spacers		
EUT Test Location:	√	3 Meter Semi-Anechoic FCC Listed Chamber				3/10m OATS		
Measurements:		Pre-Compliance			Preliminary	√	Final	
Detectors Used:		Peak	√		Quasi-Peak	√	Average	

Environmental Conditions in the Lab:
Temperature: 20 – 25°C
Relative Humidity: 30 – 60 %

Test Equipment Used:
EMI Measurement Instrument: HP8546A and Agilent E4407B
Log Periodic Antenna: EMCO #93146
Horn Antenna: EMCO #3115
Biconical Antenna: EMCO 93110
Pre-Amp: Advanced Microwave WHA6224
Standard Gain Horn: EMCO 3160-09

The following table depicts the level of significant radiated emissions found:

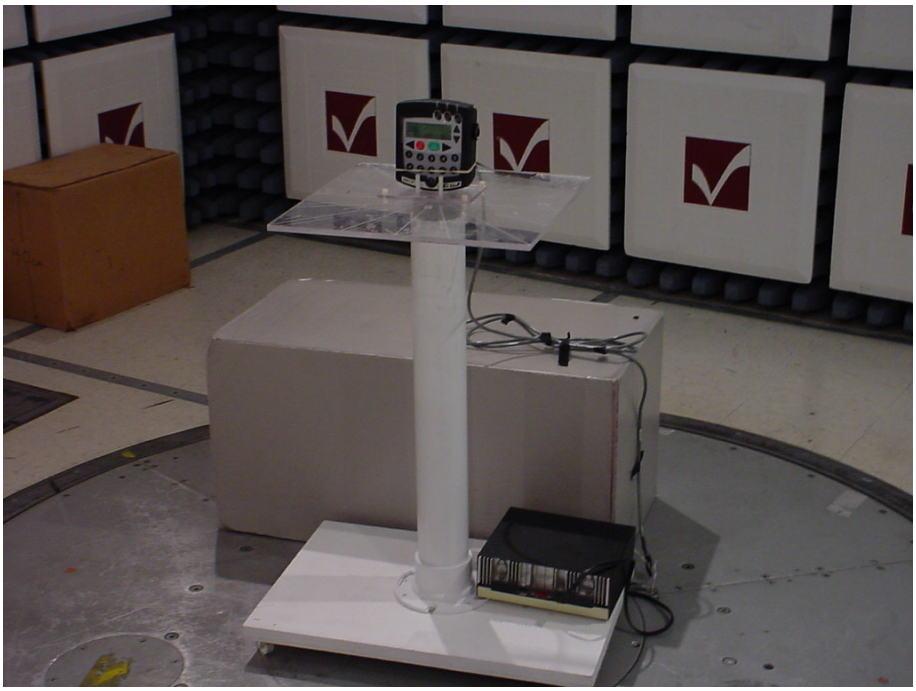
Frequency (MHz)	Antenna Polarity	Channel	Height (meters)	Azimuth (0° - 360°)	EMI Meter Reading (dBμV/m)	15.249 Limit (dBμV/m)	Margin (dB)
902.6	V	2	1.08	32	90.9	94.0	3.1
1.805	V	2	1.0	145	40.9	54.0	13.1
1.805	H	2	1.06	142	43.0	54.0	11.0
915.2	V	23	1.0	40	89.4	94.0	4.6
1.830	V	23	1.0	145	39.9	54.0	14.1
1.830	H	23	1.07	146	42.0	54.0	12.0
927.2	V	23	1.0	42	90.4	94.0	3.6
1.854	V	43	1.0	150	37.3	54.0	16.7
1.854	H	43	1.0	143	42.0	54.0	12.0

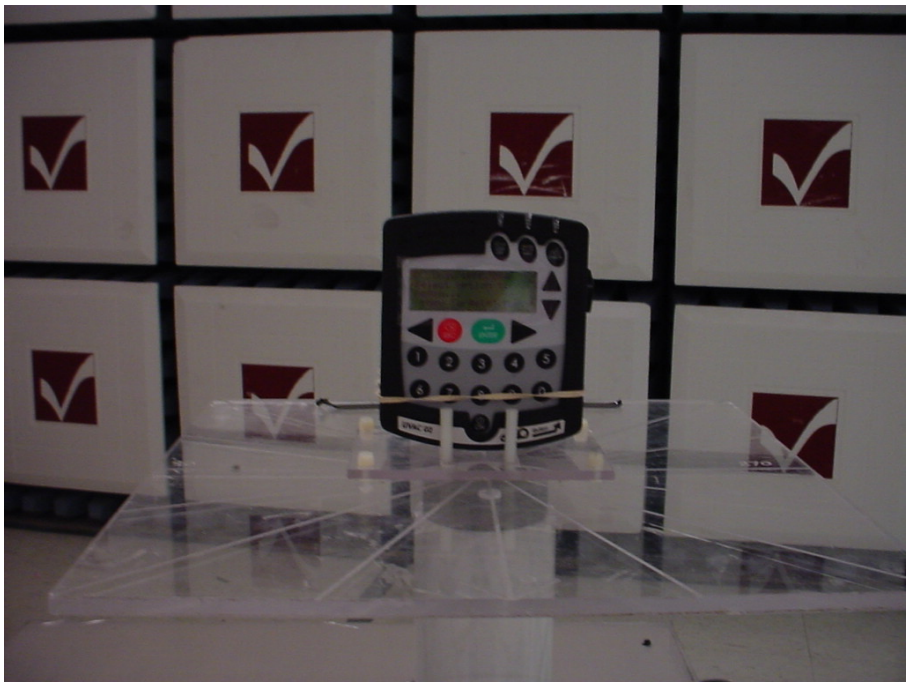
Notes:

1) A Quasi-Peak Detector was used in measurements below 1 GHz, and a Peak as well as an Average Detector was used in measurements above 1 GHz. Only the results from the Average detector are published in the table above. The peak detector was used to ensure the peak emissions did not exceed 20 dB above the limits as discussed in FCC Part 15.35(b).
2) Measurements above 5 GHz were made at 1 meters of separation from the EUT.

Photos Taken During Radiated Emission Testing

Setup for the Radiated Emissions Test





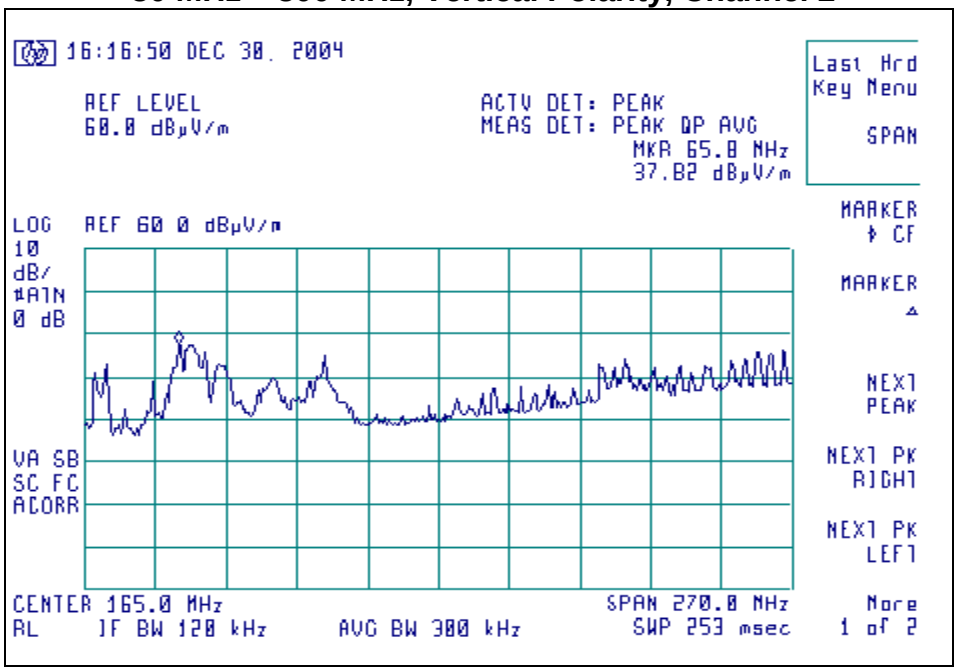
GRAPHS

Screen Captures of Radiated RF Emissions:

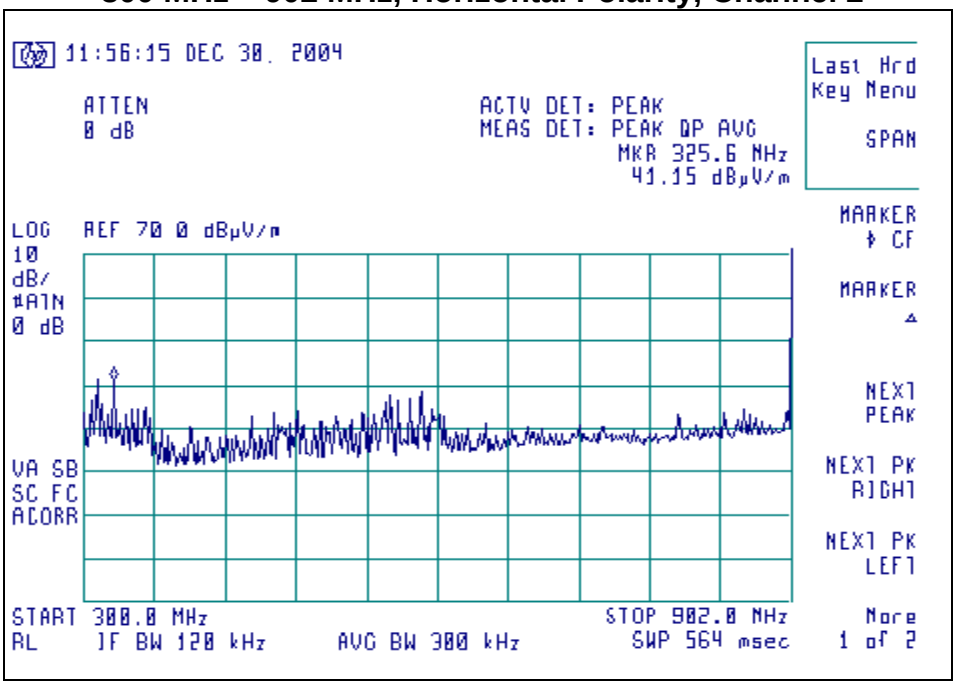
Please note these screen captures represent Peak Emissions. For radiated emission measurements, a Quasi-Peak detector function is utilized when measuring frequencies below 1 GHz, and an Average detector function is utilized when measuring frequencies above 1 GHz.

The signature scans shown here are from worst-case emissions, as measured on channels #2, #23 or #43 with the sense and EUT antennas both in vertical polarity for worst case presentations.

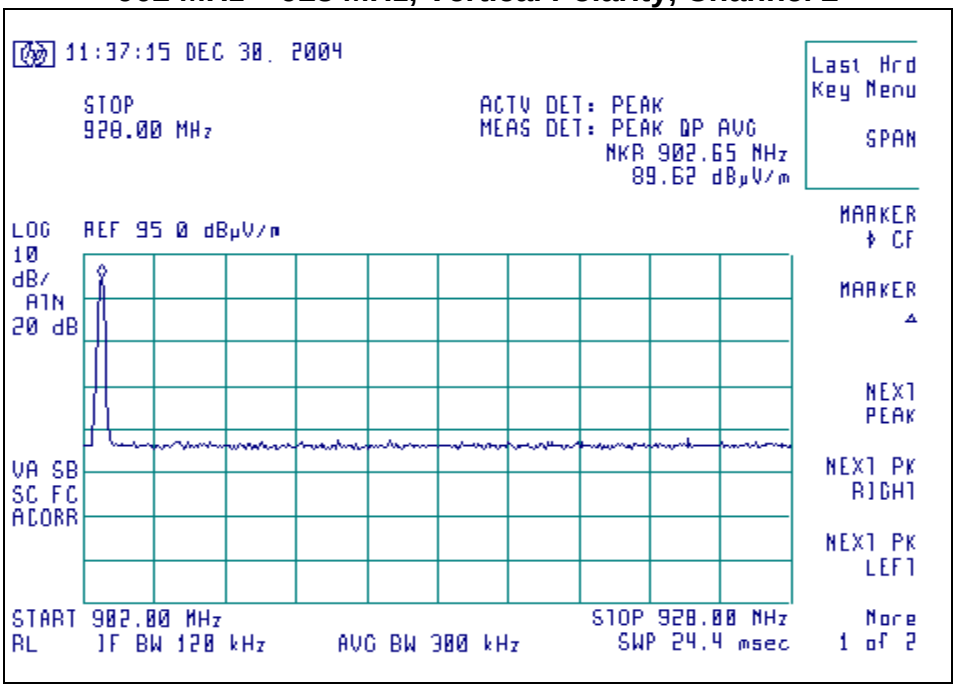
Signature Scan of Peak Radiated Emissions
30 MHz – 300 MHz, Vertical Polarity, Channel 2



Signature Scan of Peak Radiated Emissions
300 MHz – 902 MHz, Horizontal Polarity, Channel 2

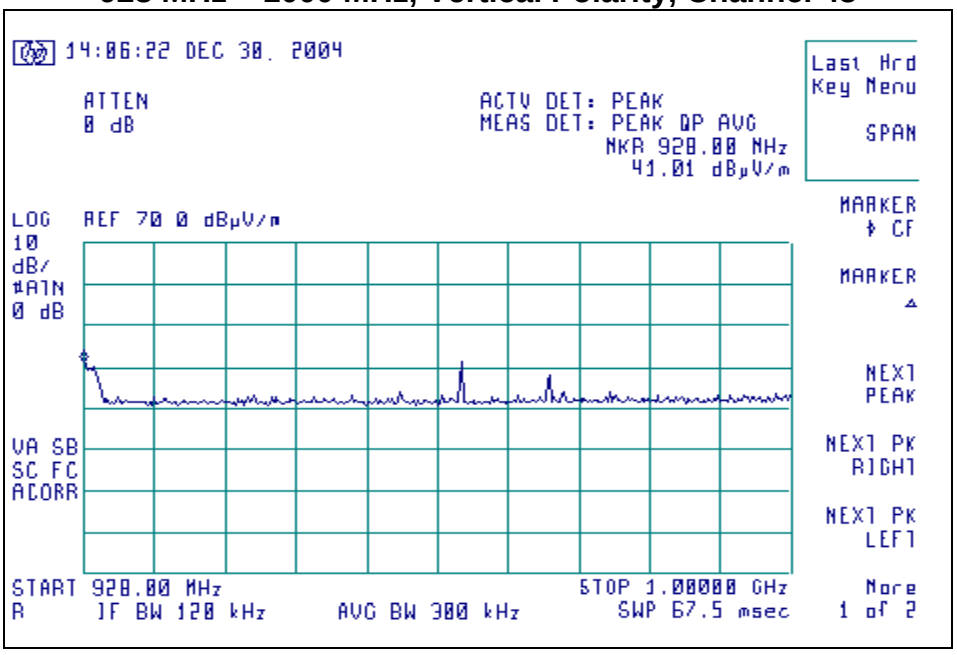


Signature Scan of Peak Radiated Emissions
902 MHz – 928 MHz, Vertical Polarity, Channel 2

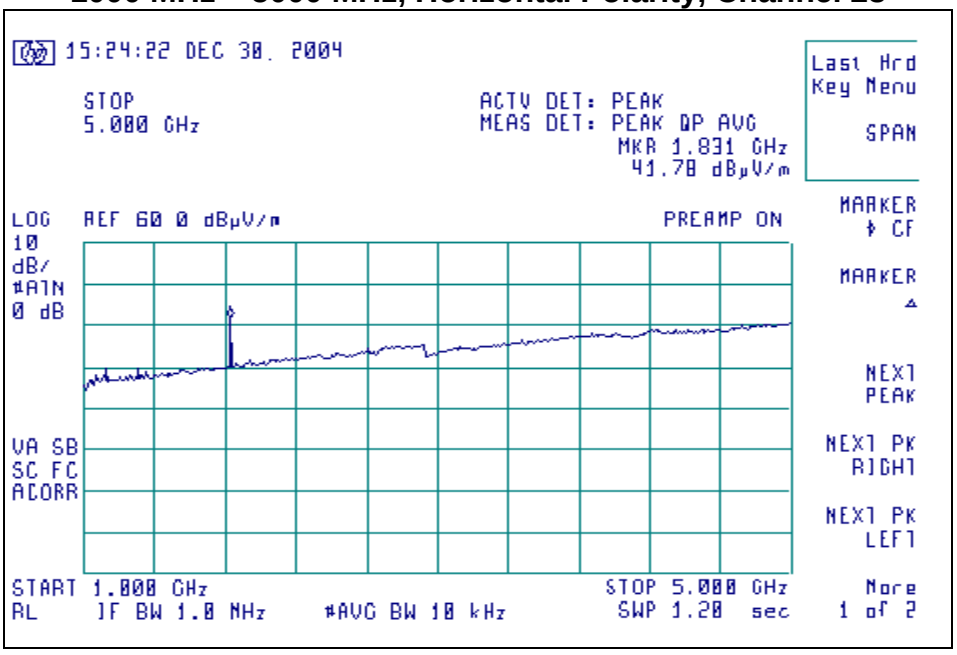


Graphs made during Radiated Emission Testing (continued)

Signature Scan of Peak Radiated Emissions
928 MHz – 1000 MHz, Vertical Polarity, Channel 43

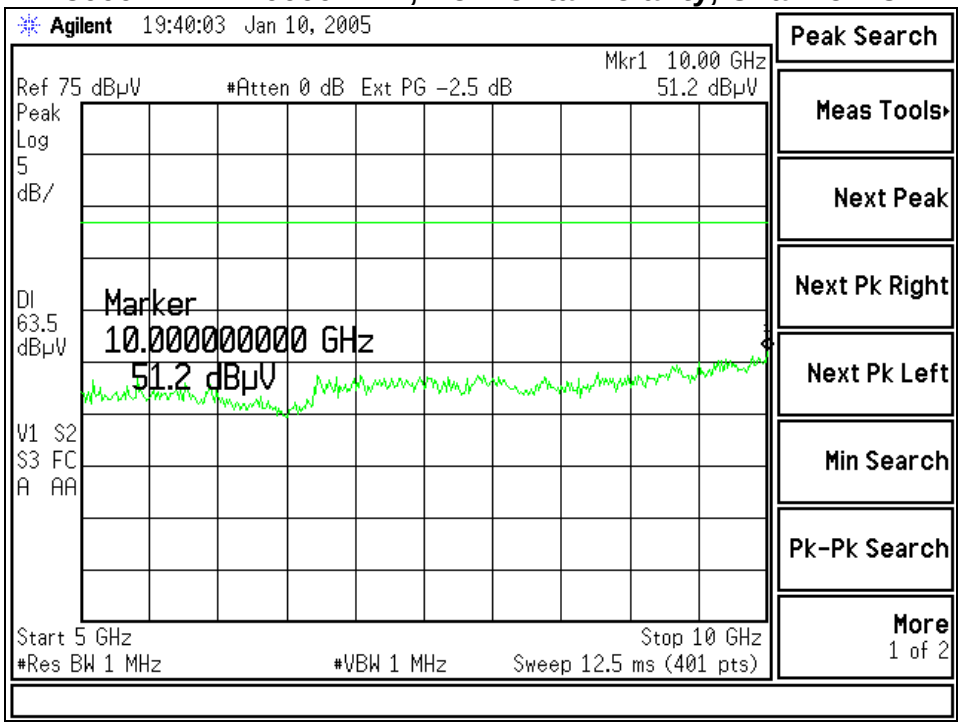


Signature Scan of Peak Radiated Emissions
1000 MHz – 5000 MHz, Horizontal Polarity, Channel 23



Graphs made during Radiated Emission Testing (continued)

Signature Scan of Peak Radiated Emissions
5000 MHz – 10000 MHz, Horizontal Polarity, Channel 23



9. Conducted Emissions Test, AC Power Line

Test Setup

The Conducted Emissions test was performed at L.S. Compliance, Inc. in Cedarburg, Wisconsin. The test area and setup are in accordance with ANSI C63.4-2005 and with Title 47 CFR, FCC Part 15, (Industry Canada RSS-210). The EUT was placed on a non-conductive wooden table, with a height of 80 cm above the reference ground plane. The EUT's power cable was plugged into a 50Ω (ohm), 50/250 μH Line Impedance Stabilization Network (LISN). The AC power supply of 120V was provided via an appropriate broadband EMI Filter, and then to the LISN line input. Final readings were then taken and recorded. After the EUT was setup and connected to the LISN, the RF Sampling Port of the LISN was connected to a 10 dB Attenuator-Limiter, and then to the HP 8546A EMI Receiver. The EMCO LISN used has the ability to terminate the unused port with a 50Ω (ohm) load when switched to either L1 (line) or L2 (neutral).

Test Procedure

The EUT was placed in modulated continuous transmit mode for this portion of the test. The appropriate frequency range and bandwidths were selected on the EMI Receiver, and measurements were made. The bandwidth used for these measurements is 9 kHz, as specified in CISPR 16-1 (2003), Section 1, Table 1, for Quasi-Peak and Average detectors in the frequency range of 150 kHz to 30MHz. Final readings were then taken and recorded.

Test Equipment Utilized

A list of the test equipment and accessories utilized for the Conducted Emissions test is provided in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. Calibrations of the LISN and Limiter are traceable to N.I.S.T. All cables are calibrated and checked periodically for conformance. The emissions are measured on the HP 8546A EMI Receiver, which has automatic correction for all factors stored in memory and allows direct readings to be taken. Both the Quasi-Peak and Average detector functions were utilized.

Test Results

The EUT was found to **MEET** the Conducted Emission requirements of FCC Part 15, Conducted Emissions for an Intentional Radiator. See the Data Charts and Graphs for more details of the test results.

Measurement of Electromagnetic Conducted Emission

Frequency Range Inspected: 150 KHz to 30 MHz

Manufacturer:	I.D. Systems, Inc.							
Date(s) of Test:	December 17th, 2005							
Test Engineer:	√	Tom Smith		Abtin Spantman		Ken Boston		
Model #:	UVAC							
Serial #:	(s)04-V1360058-FLX							
Voltage:	+6.4 VDC via 120VAC/60Hz DC power supply							
Operation Mode:	Continuous Data Modulation							
Test Location:	√	Other: Vertical and Horizontal Ground Plane				Chamber		
EUT Placed On:	√	40cm from Vertical Ground Plane				10cm Spacers		
	√	80cm above Ground Plane				Other:		
Measurements:		Pre-Compliance		Preliminary	√	Final		
Detectors Used:		Peak	√	Quasi-Peak	√	Average		

Environmental Conditions in the Lab:
Temperature: 20 – 25° C
Atmospheric Pressure: 86 kPa – 106 kPa
Relative Humidity: 30 – 60%

Test Equipment Utilized:
EMI Receiver: HP 8546A
LISN: EMCO 3816/2NM
Transient Limiter: HP 119474A

		QUASI-PEAK			AVERAGE		
Frequency (MHz)	Line	Q-Peak Reading (dBµV/m)	Q-Peak Limit (dBµ V/m)	Quasi-Peak Margin (dB)	Average Reading (dBµV/m)	Average Limit (dBµ V/m)	Average Margin (dB)
0.1561	L1	47.8	65.6	17.8	21.0	55.6	34.6
0.3041	L1	44.8	60.2	15.4	17.8	50.2	32.4
0.3691	L1	43.7	58.5	14.8	16.3	48.5	32.2
0.4704	L1	38.9	56.5	17.6	11.9	46.5	34.6
15.0	L1	40.7	60.0	19.3	40.5	50.0	9.5
0.2290	L2	45.1	62.4	17.3	17.8	52.4	34.6
0.3287	L2	45.0	59.7	14.7	17.7	49.7	32.0
0.3637	L2	44.3	58.7	14.4	17.0	48.7	31.7
0.4730	L2	39.2	56.1	16.9	12.3	46.1	33.8
15.0	L2	46.8	60.0	13.2	45.8	50.0	4.2
19.0	L2	10.8	60.0	49.2	4.7	50.0	45.3

Notes:
1) The emissions listed are characteristic of the power supply used, and did not change by the EUT.
2) All other emissions noted were better than 20 dB below the limits
3) The EUT exhibited similar emissions in the transmit and receive modes, and across the Low, Mid, and High channels tested.

Calculation of Conducted Emissions Limits

The following table describes the Class B limits for an unintentional radiator. These limits are obtained from Title 47 CFR, Part 15.107 (a) for Conducted Emissions.

Frequency (MHz)	Quasi-Peak Limit (dBµV)	Average Limit (dBµV)
0.15 – 0.5	66 – 56 *	56 - 46
0.5 – 5.0	56	46
5.0 – 30.0	60	50

* Decreases with the logarithm of the frequency.

Sample calculation for the limits in the 0.15 to 0.5 MHz:

$$\text{Limit} = -19.12 \left(\text{Log}_{10} \left(F[\text{MHz}] / 0.15 [\text{MHz}] \right) \right) + 66.0 \text{ dB}\mu\text{V}$$

For a frequency of 200 kHz for example:

$$\text{Quasi-Peak Limit (F=200kHz)} = -19.12 \left(\text{Log}_{10} \left(0.2[\text{MHz}] / 0.15 [\text{MHz}] \right) \right) + 66.0 \text{ dB}\mu\text{V}$$

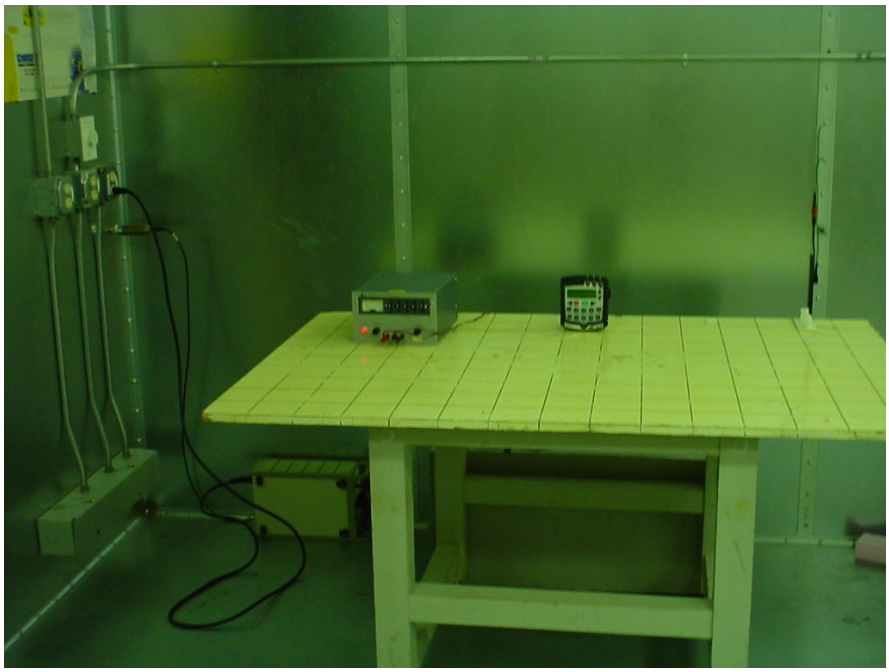
$$\text{Quasi-Peak Limit (F=200kHz)} = 63.6 \text{ dB}\mu\text{V}$$

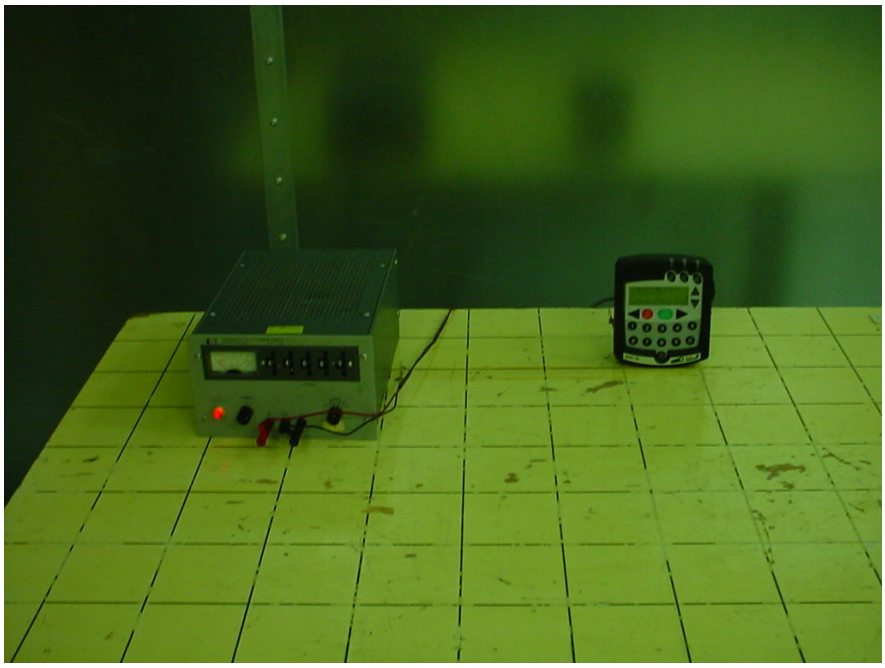
$$\text{Average Limit (F=200kHz)} = -19.12 \left(\text{LOG}_{10}(0.2[\text{MHz}]/0.15[\text{MHz}]) \right) + 56.0 \text{ dB}\mu\text{V}$$

$$\text{Average Limit (F = 200 kHz)} = 53.6 \text{ dB}\mu\text{V}$$

Photo(s) Taken During Conducted Emission Testing

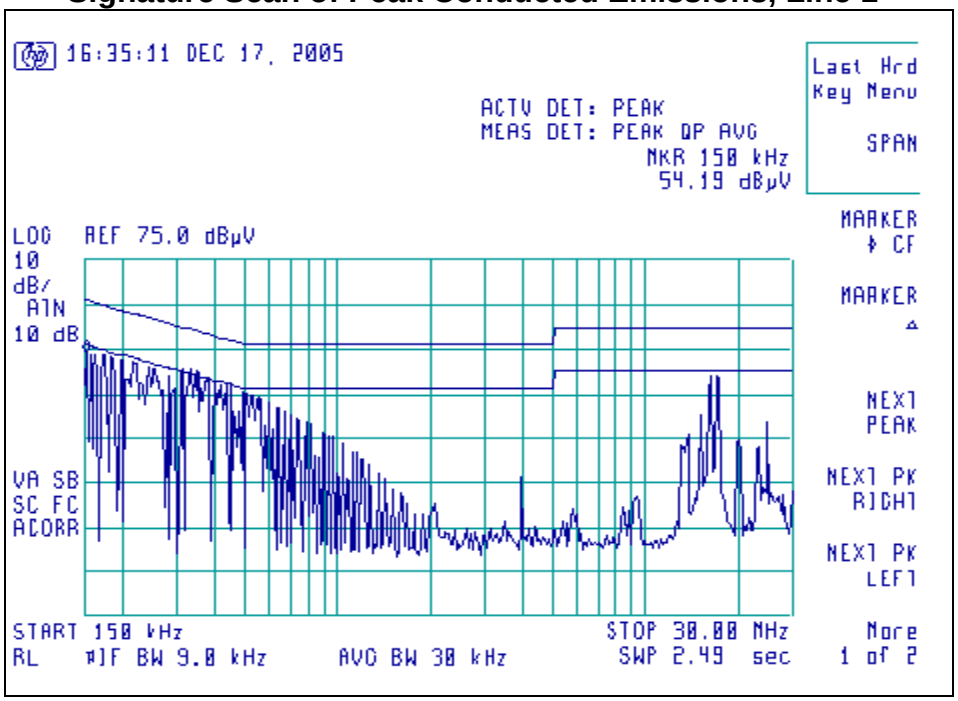
Setup for the Conducted Emissions Test



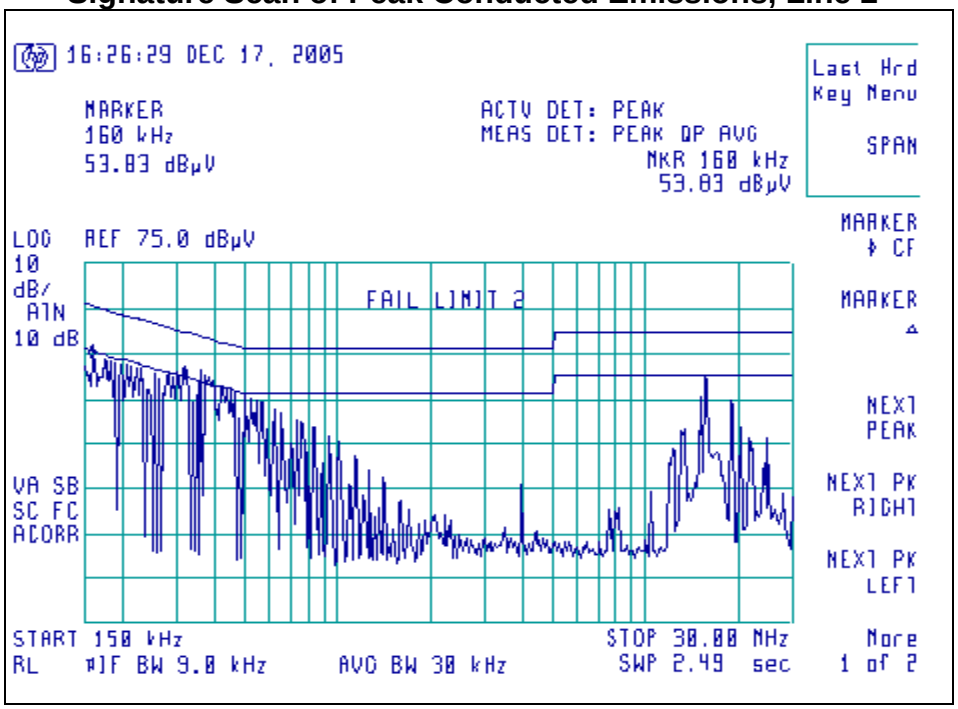


Graphs made during Conducted Emission Testing

Signature Scan of Peak Conducted Emissions, Line 1*



Signature Scan of Peak Conducted Emissions, Line 2*

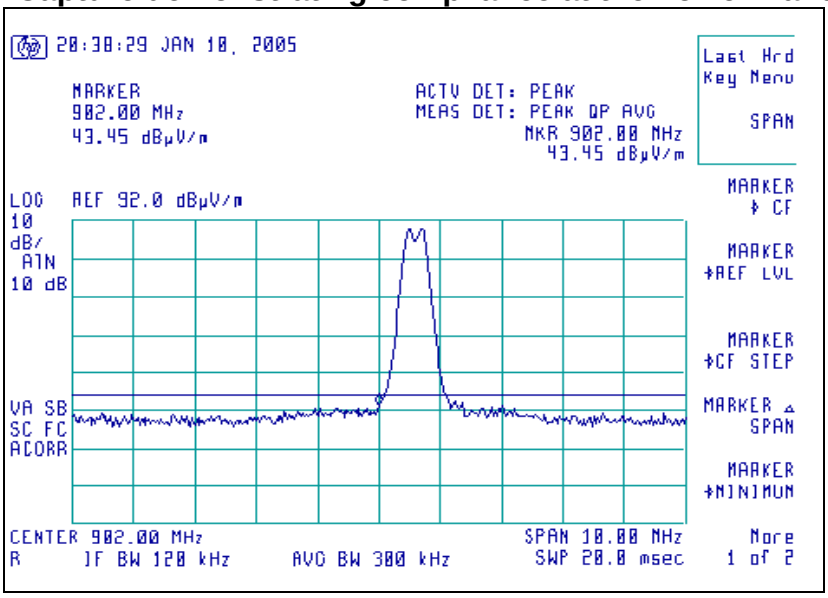


* Note: The indication of failure of limits is the result of peak emissions above the QP and Average limit. However, as shown in the data table, all QP and Average emissions pass the respective limit.

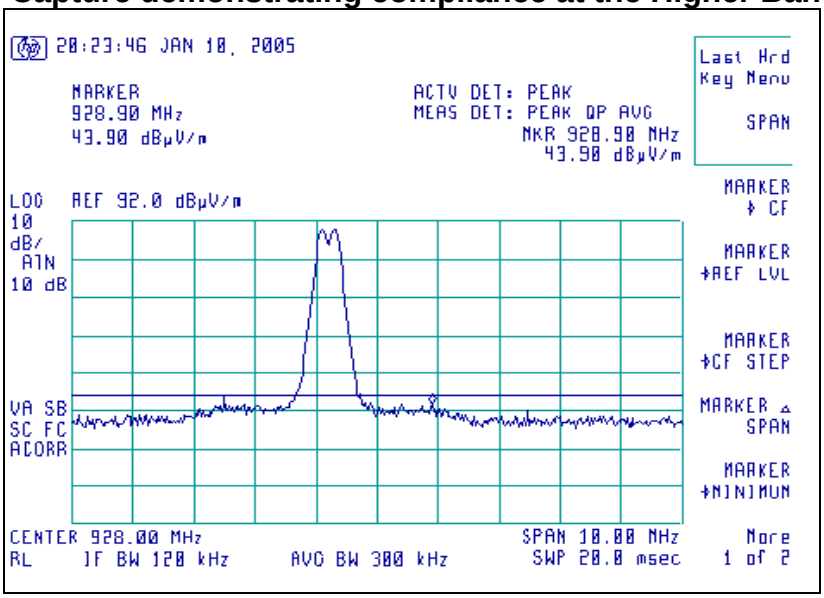
10. Band-Edge Measurements

FCC 15.209(b) and 15.249(d) require a measurement of spurious emission levels, in particular at the band-edges where the intentional radiator operates. The following screen captures demonstrate compliance of the intentional radiator at the 902-928 MHz band-edges. The EUT was operated at the lowest channel, with continuous modulation, with typical data as the modulating source, for the investigation of the lower band-edge, and at the highest channel for the investigation of the higher band-edge.

Screen Capture demonstrating compliance at the Lower Band-Edge



Screen Capture demonstrating compliance at the Higher Band-Edge



11. Frequency and Power Stability across input voltage

The fundamental emission of the transmitter needs to be stable with varying voltage. According to the FCC Part 15.31 (e) the supply voltage should be varied between 85 % and 115 % from the nominal specified voltage. The EUT was tested in the semi-anechoic chamber, with the transmitter portion of the EUT placed in continuous C.W. transmit mode. The fundamental frequency was measured with a receiver bandwidth of 120 kHz, and video bandwidth of 300 kHz, for frequency measurements and receiver bandwidth of 30 Hz and a video bandwidth of 30 Hz for power measurments.

	Voltage	Channel Low Center Freq (MHz)	Channel Mid Center Freq (MHz)	Channel High Center Freq (MHz)
115 % of Nominal	7.36 VDC	902.612493	915.215615	927.218430
100 % of Nominal	6.40 VDC	902.612510	915.215591	927.218445
85 % of Nominal	5.44 VDC	902.612513	915.215596	927.218446

No anomalies were noted, in the frequency of operation, during the voltage variation tests.

	Voltage	Channel Low ERP (dBμV/m) at 3 m	Channel Mid ERP (dBμV/m) at 3 m	Channel High ERP (dBμV/m) at 3 m
115 % of Nominal	7.36 VDC	90.6	90.0	90.9
100 % of Nominal	6.40 VDC	90.6	90.0	90.9
85 % of Nominal	5.44 VDC	90.7	90.0	90.8

No anomalies were noted, in fundamental power, during the voltage variation tests.

Appendix A

Test Equipment List

Asset #	Manufacturer	Model #	Serial #	Description	Date	Due
AA960008	EMCO	3816/2NM	9701-1057	Line Impedance Stabilization Network	9/27/05	9/27/06
AA960031	HP	119474A	3107A01708	Transient Limiter	Note 1	Note 1
AA960077	EMCO	93110B	9702-2918	Biconical Antenna	9/27/05	9/27/06
AA960078	EMCO	93146	9701-4855	Log-Periodic Antenna	9/27/05	9/27/06
AA960081	EMCO	3115	6907	Double Ridge Horn Antenna	12/07/05	12/07/06
CC00221C	Agilent	E4407B	US39160256	Spectrum Analyzer	12/29/05	12/29/06
EE960004	EMCO	2090	9607-1164	Device Controller	N/A	N/A
EE960013	HP	8546A	3617A00320	Receiver RF Section	9/29/05	9/29/06
EE960014	HP	85460A	3448A00296	Receiver Pre-Selector	9/29/05	9/29/06
N/A	LSC	Cable	0011	3 Meter ½" Armored Cable	Note 1	Note 1
N/A	LSC	Cable	0050	10 Meter RG 214 Cable	Note 1	Note 1
N/A	Pasternack	Attenuator	N/A	10 dB Attenuator	Note 1	Note 1

Note 1 - Equipment calibrated within a traceable system.

Uncertainty Statement

This uncertainty represents an expanded uncertainty
expressed at approximately the 95% confidence level, using a coverage factor of k=2.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.24 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.8 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.18 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.92 dB
Conducted Emissions	Shielded Room/EMCO LISN	1.60 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	1.128 Volts/Meter
Conducted Immunity	3 Volts level	1.0 V