Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
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Portée d'accréditation 75

TM

Test Report:	6W65142
Applicant:	Paradox Security Systems 780 Industrial Blvd. Ste-Eustache, Quebec J7R 5V3, Canada
Apparatus:	DGP-R910
FCC ID:	KDYDGPR910
In Accordance With:	FCC Part 15 Subpart C, 15.207 and 15.209 Intentional Radiators
Tested By:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Authorized By:	Jason Nixon, Telecom Specialist
Date:	June 28, 2006
Total Number of Pages:	24

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	DGP-R910
Specification:	FCC Part 15 Subpart C, 15.207 and 15.209
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Roman Kuleba, EMC/Wireless Test Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

TABLE OF CONTENTS

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

DGP-R910 Proximity Reader

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
1	DGP-R910 Proximity Reader, sealed in epoxy	EFN060412C
2	DGP-R910 Proximity Reader, without epoxy	EFN060412D

The first samples were received on: April 19, 2006

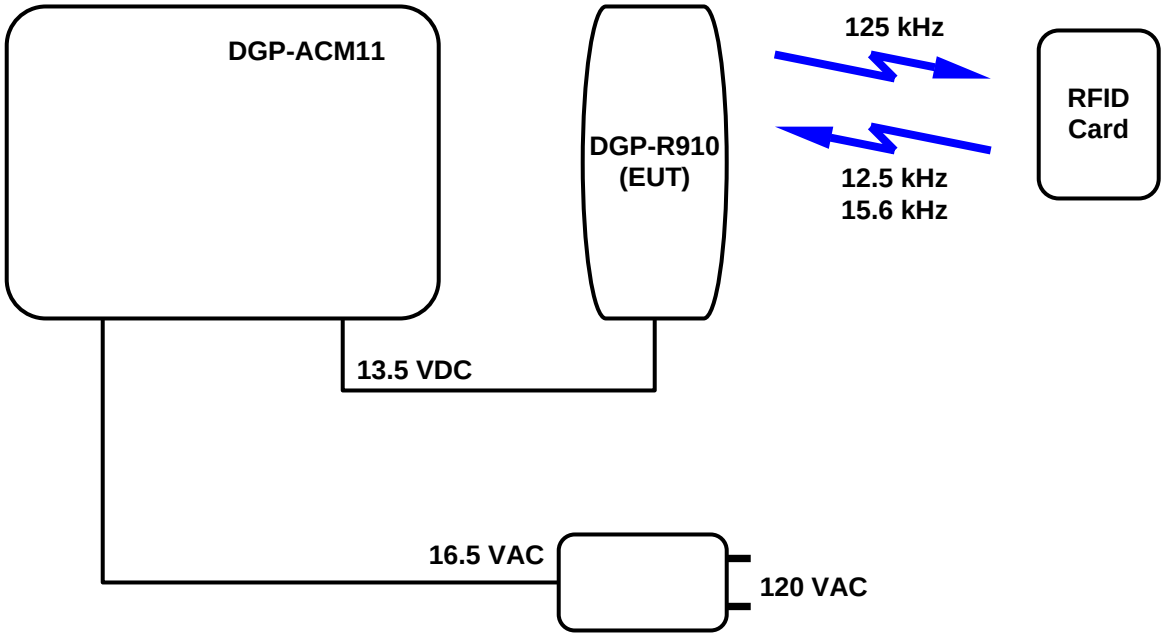
1.3 Theory of Operation

The DGP-R910 Proximity Reader is a card reader with an operating frequency of 125 kHz. The chip in the card communicates with the card reader through RFID induction technology. The contactless card is powered by RF magnetic field generated by the reader. The card's antenna picks up a 125 kHz carrier wave from the reader, and the tag responds by transmitting data on 12.5 kHz and 15.6 kHz.

1.4 Technical Specifications of the EUT

Manufacturer:	Paradox Security Systems
Transmitter Frequency:	125 kHz
Modulation:	FSK
Antenna Data:	Integrated Loop
Antenna Connector:	None
Power Source:	13.5 VDC from voltage regulator on DGP-ACM11 module

1.5 Block Diagram of the EUT



Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.207 and 15.209
Intentional Radiators

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 ^{o}C
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
LISN	EMCO	4825/2	FA001545	Jan 30/06	Jan. 30/07
Receiver	Rohde & Schwarz	ESHS 10	FA001918	Feb. 17/06	Feb. 17/07
Transient Limiter	Hewlett-Packard	1194 7A	FA000975	May 25/05	May 25/06
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 18/05	May 18/06
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 18/05	May 18/06
Bilog Antenna	Schaffner	CBL6112B	FA001504	NCR	NCR [1]
Biconical (2) Antenna	EMCO	3109	FA000904	Aug. 26/05	Aug. 26/06
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 29/05	Aug. 29/06
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 27/05	July 27/06
Horn Antenna #1	EMCO	3115	FA000649	Jan 12/07	Jan. 12/07
Active Loop Antenna	Rohde & Schwarz	HFH2-Z2	FA000631	May 20/05	May 20/06
Spectrum Analyzer	Rohde & Schwarz	FSU	FA001877	May 17/05	May 17/06

[1] NCR (No Calibration Required)
[2] COU (Calibrate on Use)

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

3.5 Additional Observations

There were no additional observations made during this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 15 Subpart C : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N	No : not applicable / not relevant.
Y	Yes : Mandatory i.e. the apparatus shall conform to these tests.
N/T	Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.207(a)	AC Power Lines Conducted Emissions	YES	PASS
15.209	Radiated Emissions, General Requirements	YES	PASS
2.1049 (h) & 15.215 (c)	Occupied Bandwidth	YES	PASS
15.215 (c)	Transmitter Frequency Stability	YES	PASS
15.31 (e)	Supply Voltage Variation	YES	PASS

Note: The EUT does not operate in stand-by or receiving mode.

Appendix A : Test Results

Clause §15.207(a) AC Power Lines Conducted Emissions

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of	Conducted Limit (dBmV)	
Emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Conditions:

Sample Number:	1	**Temperature:**	22°C
Date:	May 3, 2006	**Humidity:**	30 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Pass (See Attached Plots and Table).

Additional Observations:

AC Power Lines Conducted Emissions, continued

Test Date: May 3, 2006

Engineer's Name: Roman Kuleba

Tested as per: Table Top

Mains Input Voltage: 120 VAC | Mains Input Frequency: 60 Hz

Port under test: AC mains input of auxiliary equipment

Test Data: Refer to plots and tables (if applicable) of this section.

Conductor	Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
Phase	0.1500	Quasi Peak	46.3	0.00	0.00	46.30	66.0	19.7
		Average	15.9	0.00	0.00	15.90	56.0	40.1
	1.1500	Quasi Peak	8.1	0.00	0.20	8.30	56.0	47.7
		Average	2.6	0.00	0.20	2.80	46.0	43.2
	10.0000	Quasi Peak	4.0	0.20	0.40	4.60	60.0	55.4
		Average	-2.9	0.20	0.40	-2.30	50.0	52.3
Neutral	0.1500	Quasi Peak	45.0	0.00	0.00	45.00	66.0	21.0
		Average	14.9	0.00	0.00	14.90	56.0	41.1
	1.1500	Quasi Peak	8.8	0.00	0.20	9.00	56.0	47.0
		Average	3.3	0.00	0.20	3.50	46.0	42.5
	10.0000	Quasi Peak	4.1	0.20	0.40	4.70	60.0	55.3
		Average	-2.7	0.20	0.40	-2.10	50.0	52.1

Notes

None

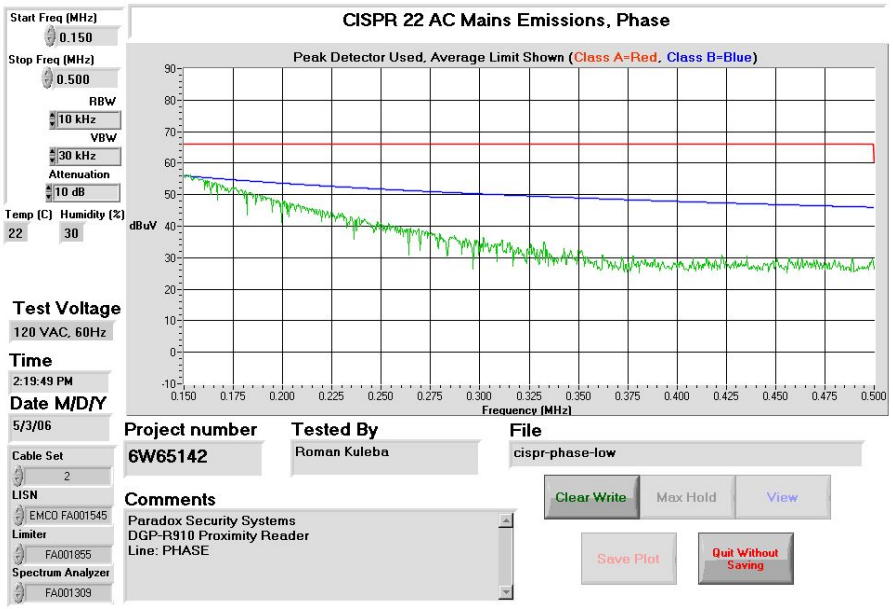
Test Result

Final Test Result: Pass

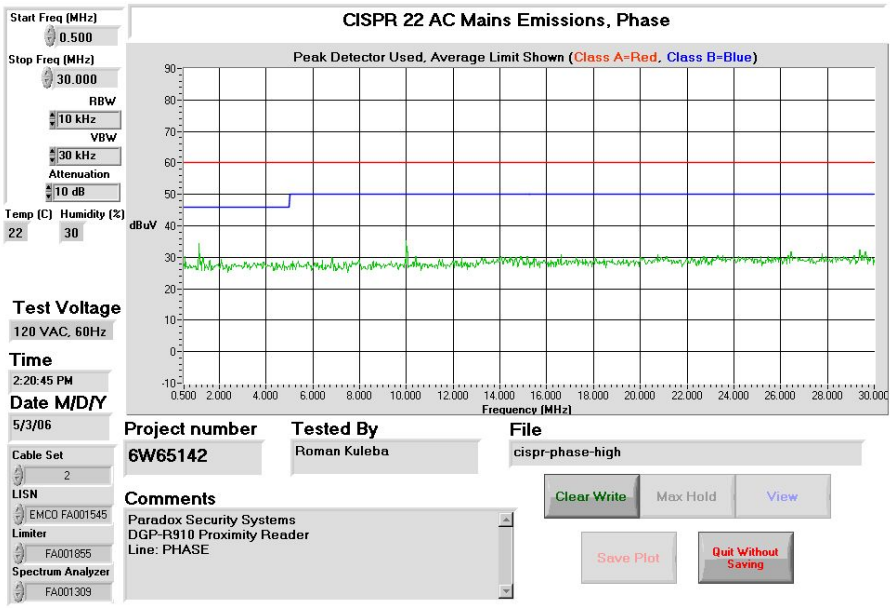
AC Power Lines Conducted Emissions, continued

Conducted Disturbance at Mains Plots

120VAC/60Hz, Phase



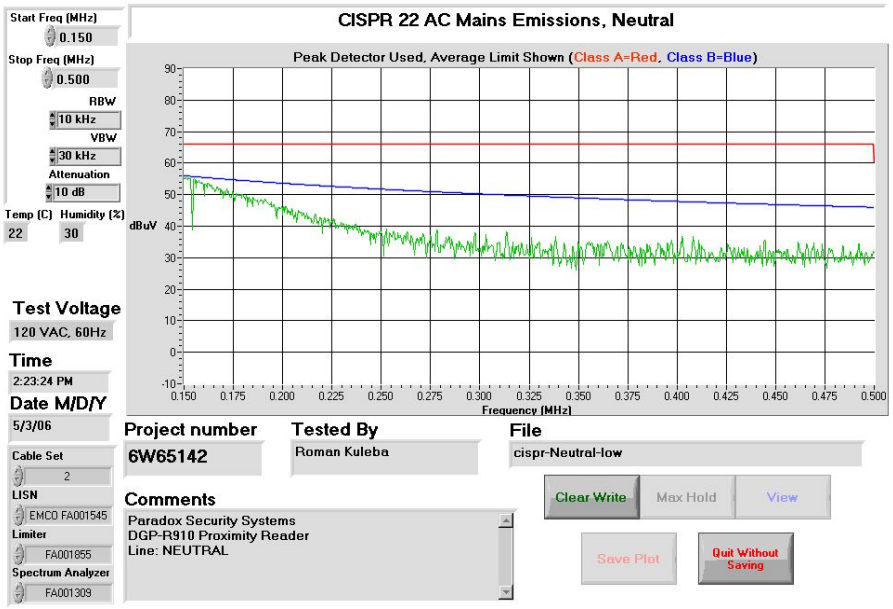
120VAC/60Hz, Phase



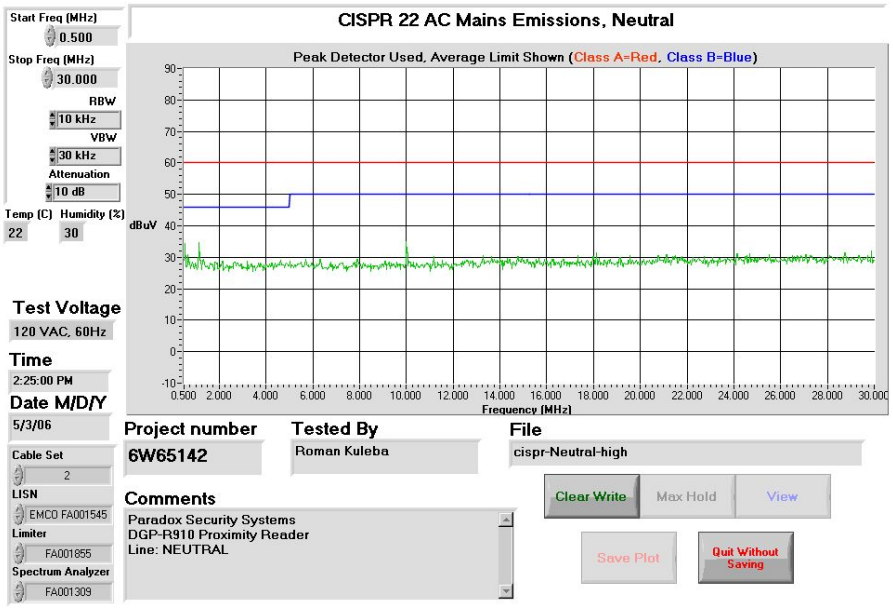
AC Power Lines Conducted Emissions, continued

Conducted Disturbance at Mains Plots

120VAC/60Hz, Phase



120VAC/60Hz, Phase



Clause §15.209 Radiated Emission Limits, General Requirements

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Conditions:

Sample Number:	1	**Temperature:**	22°C
Date:	May 4, 2006	**Humidity:**	30 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Pass (See Attached Tables).

Additional Observations:

The Spectrum was searched from 9 kHz to 1 GHz.

The EUT was measured on three orthogonal axes.

Measurement equipment was set to Quasi-peak Detector mode with RBW 200 Hz, 9 kHz and 120 kHz for measurements in frequency range 9 – 150 kHz, 150 kHz – 30 MHz and 30 MHz – 1 GHz respectively.

All Measurements were performed at 3 meters. Limits for emissions below 30 MHz were corrected for 3 m distance using 40 dB/decade (near-field) extrapolation factor.

Radiated Emissions, continued

Frequency Range Investigated: 30 MHz – 1 GHz

Freq. (MHz)	Ant [1]	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr. (dB)	Cable Loss (dB)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
31.9990	BC2	V	19.6	11.8	N/A	N/A	1.3	32.7	40.0	7.3
48.0000	BC2	V	21.5	10.3	N/A	N/A	1.5	33.3	40.0	6.7
64.0000	BC2	V	18.0	8.0	N/A	N/A	1.5	27.5	40.0	12.5
86.4750	BC2	V	27.5 [2]	8.8	N/A	N/A	1.6	37.9	40.0	2.1
92.7000	BC2	V	17.0 [2]	9.3	N/A	N/A	1.6	27.9	43.5	15.6
127.9972	BC2	V	13.9	13.0	N/A	N/A	1.8	28.7	43.5	14.8
160.0000	BC2	V	9.4	13.1	N/A	N/A	1.9	24.4	43.5	19.1
192.0000	BC2	V	8.3	14.4	N/A	N/A	2.0	24.7	43.5	18.8
31.9990	BC2	H	15.0	13.0	N/A	N/A	1.3	29.3	40.0	10.7
48.0000	BC2	H	6.0	10.7	N/A	N/A	1.5	18.2	40.0	21.8
64.0000	BC2	H	10.8	8.3	N/A	N/A	1.5	20.6	40.0	19.4
91.8000	BC2	H	20.0 [2]	8.4	N/A	N/A	1.6	30.0	43.5	13.5
111.9970	BC2	H	20.2	11.0	N/A	N/A	1.8	33.0	43.5	10.5
127.9972	BC2	H	9.9	12.3	N/A	N/A	1.8	24.0	43.5	19.5
160.0000	BC2	H	13.9	12.1	N/A	N/A	1.9	27.9	43.5	15.6
192.0000	BC2	H	20.9	13.6	N/A	N/A	2.0	36.5	43.5	7.0
224.0000	BC2	H	5.3	14.7	N/A	N/A	2.2	22.2	46.0	23.8

Notes:
[1] Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole
[2] Ambient Noise Measured

Radiated Emissions, continued

Total Field (all 3 orthogonal components combined)
Frequency Range Investigated: 9 kHz – 30 MHz

Freq. kHz	Detector QP/Avg	Voltage dBµV	AFE dB	E - field dBµV/m	E - field Limit dBµV/m	H-field dBµA/m	H - field Limit dBµA/m	Margin dB
50.9	QP	37.2	19.5	56.7	113.5	5.2	61.9	56.8
50.9	Avg	37.8	19.5	57.3	113.5	5.8	61.9	56.2
125	QP	66.4	19.5	85.9	105.7	34.3	54.1	19.8
125	Avg	66.9	19.5	86.4	105.7	34.8	54.1	19.3
250	QP	46.1	19.3	65.4	99.6	13.8	48.1	34.3
250	Avg	32.0	19.3	51.3	99.6	-0.2	48.1	48.4
460	QP	15.4	19.4	34.8	94.3	-16.7	42.8	59.5
460	Avg	11.3	19.4	30.7	94.3	-20.8	42.8	63.6

Sample Calculation:

Voltage measured with loop antenna in X-axis: $V_X = 46.5\ dB\mu V = 10^{(46.5/20)} = 211.35\ \mu V$
Voltage measured with loop antenna in Y-axis: $V_Y = 66.7\ dB\mu V = 10^{(66.7/20)} = 2162.72\ \mu V$
Voltage measured with loop antenna in Z-axis: $V_Z = 51.8\ dB\mu V = 10^{(51.8/20)} = 389.05\ \mu V$

Total voltage (all 3 orthogonal components combined):

$$V = 20 \cdot \log_{10} \sqrt{V_X^2 + V_Y^2 + V_Z^2} = 20 \cdot \log_{10} \sqrt{211.35^2 + 2162.72^2 + 389.05^2}$$

$$V = 20 \cdot \log_{10}(2207.57\ \mu V) = 66.9\ dB\mu V$$

Total E-field: $E = V + AFE = 66.9 + 19.5 = 86.4\ dB\mu V/m$ (at 125 kHz)
Total H-field: $H = E - 20 \cdot \log_{10}(376.7\ \Omega) = E - 51.52 = 34.8\ dB\mu A/m$ (at 125 kHz)

Limit at d = 300m: $Limit = 20 \cdot \log_{10}(2400/F) = 20 \cdot \log_{10}(2400/125) = 25.7\ dB\mu V/m$
Limit at d = 3m: $Limit = 20 \cdot \log_{10}(2400/F) + 40 \cdot \log_{10}(300m/3m) = 25.7 + 80.0 = 105.7\ dB\mu V/m$

Margin: $Margin = Limit - E = 105.7 - 86.4 = 19.3\ dB$

Clause §2.1049(h) & §15.215(c) Occupied Bandwidth

§2.1049 Measurement required: Occupied bandwidth.
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

§15.215 Additional provisions to the general radiated emission limitations (20 dB bandwidth of the emission)

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through §15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Conditions:

Sample Number:	1	**Temperature:**	22°C
Date:	May 5, 2006	**Humidity:**	30 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

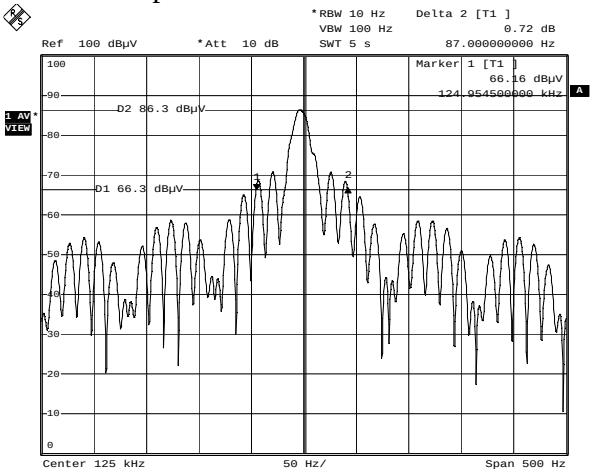
Test Results: Pass (See Attached Plots).

Additional Observations:

The 20 dB bandwidth of the emissions is contained within the 110 – 490 kHz band under normal and extreme conditions.

Occupied Bandwidth, continued

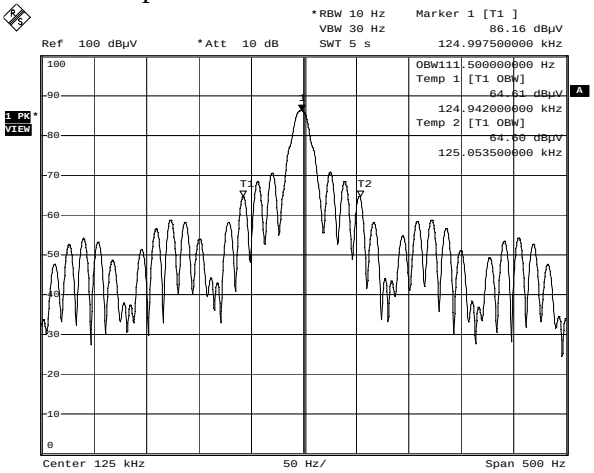
20 dB Occupied Bandwidth



Occupied Bandwidth

Date: 5.MAY.2006 00:43:34

99 % Occupied Bandwidth



Occupied Bandwidth

Date: 5.MAY.2006 00:34:48

Clause §2.1055 Frequency Stability

(a) The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From -30° to +50° centigrade for all equipment except that specified in paragraphs (a)(2) and (3) of this section;
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.
(d) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

Test Conditions:

Sample Number:	1	**Temperature:**	-30 °C to +50 °C
Date:	May 5, 2006	**Humidity:**	0 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Pass (See Attached Tables).

Additional Observations:

The 20 dB bandwidth of the emissions is contained within the 110 – 490 kHz band under normal and extreme conditions.

Frequency Stability, continued

Limit: No specification.

Temperature: 20 °C

Voltage (VAC)	Voltage/Nom.Voltage (%)	Carrier Frequency (kHz)	Deviation (Hz)
102	85	124.997000	0.000000
120	**100**	**124.997000**	0.000000
138	115	125.005000	8.000000

Voltage: 120 VAC

Temperature (°C)	Carrier Frequency (kHz)	Deviation (Hz)
-30	135.870000	10873.000000
-20	126.162000	1165.000000
-10	125.580000	583.000000
0	124.998000	1.000000
10	124.997000	0.000000
20	**124.997000**	0.000000
30	125.005000	8.000000
40	125.012000	15.000000
50	125.020000	23.000000

Clause §15.31(e) Measurement standards, Power Supply Voltage Variation

§15.31(e) For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Conditions:

Sample Number:	1	**Temperature:**	22°C
Date:	May 5, 2006	**Humidity:**	30 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

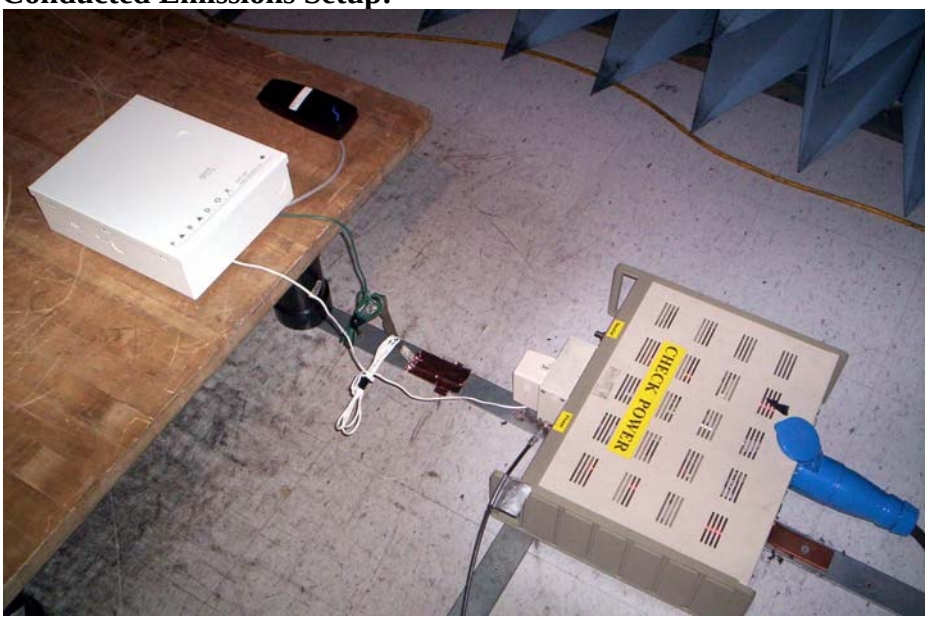
Test Results: Pass.

Additional Observations:

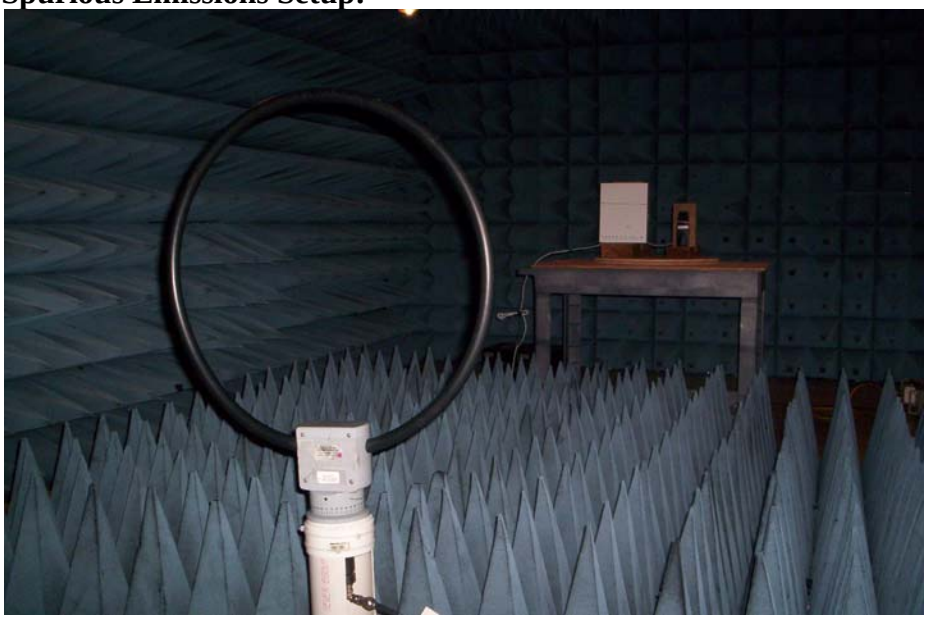
Power supply voltage was varied from 102 VAC to 138 VAC (85% to 115% of the nominal rated supply voltage). No measurable change in output RF power was noticed.

Appendix B : Setup Photographs

Conducted Emissions Setup:

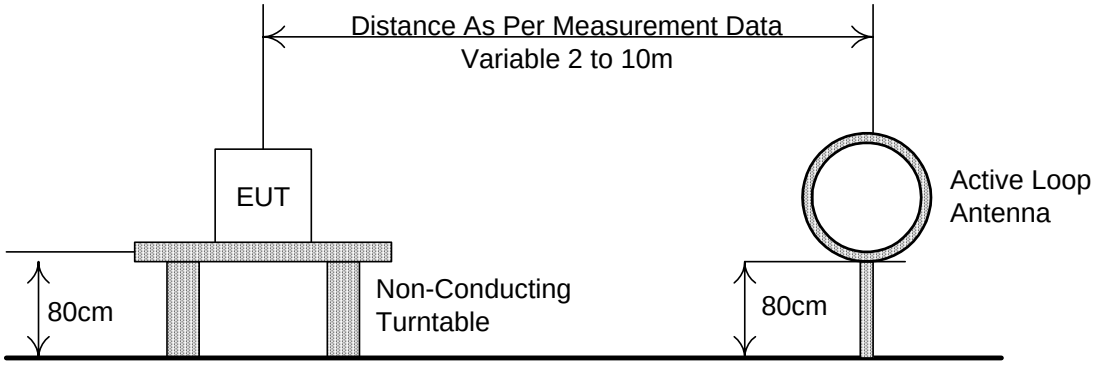


Spurious Emissions Setup:

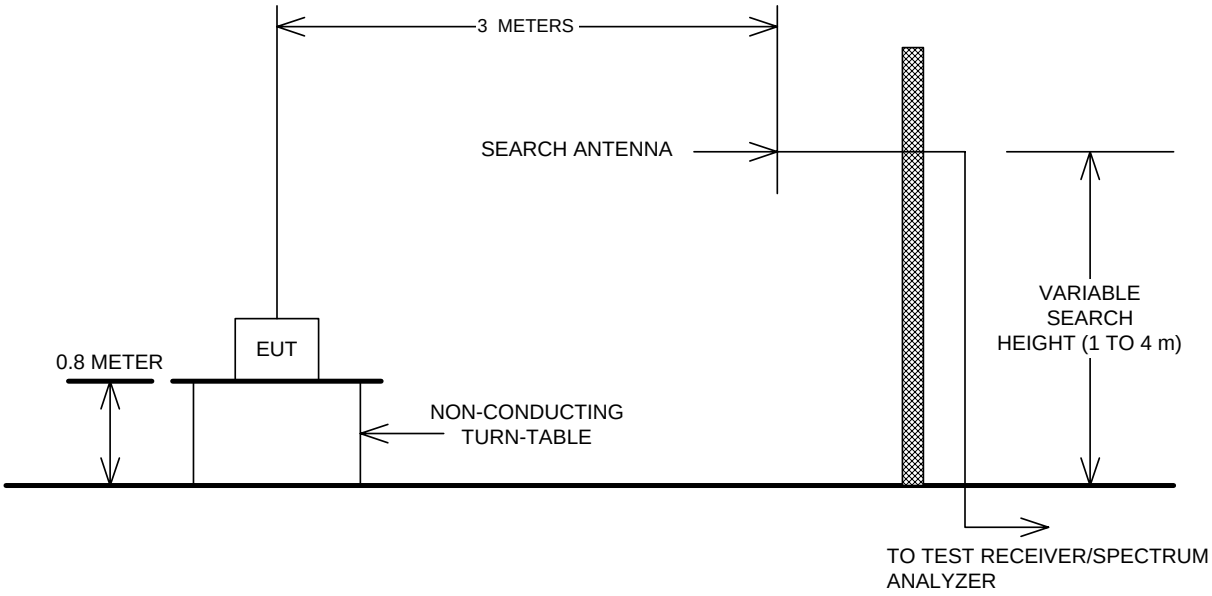


Appendix C : Block Diagram of Test Setups

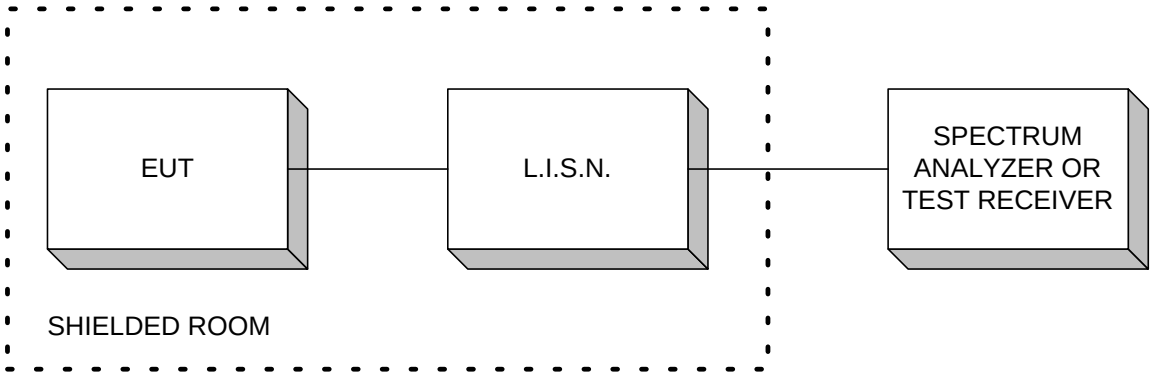
Test Site For Radiated Emissions Below 30MHz



Test Site For Radiated Emissions Above 30MHz



Conducted Emissions



Frequency Stability