Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 75

TM

Test Report:	5W57547 Issue 2
Applicant:	Digital Security Controls Ltd 3301 Langstaff Road, Vaughan, Ontario L4K 4L2
Apparatus:	F2-300 Series Motion Detectors
FCC ID:	F5306F23X
In Accordance With:	FCC Part 15 Subpart C, 15.245 Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz and 24075-24175 MHz
Tested By:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Authorized By:	Sim Jagpal, Resource Manager
Date:	January 31, 2006
Total Number of Pages:	22

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:	F2-300 Series Motion Detectors
Specification:	FCC Part 15 Subpart C, 15.245
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Issue 2 – Addition of 20dB bandwidth test results and AC Power line conducted results

Author: Jason Nixon, Telecom 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.

Nemko Canada Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

TABLE OF CONTENTS

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

F2-300 Series Motion Detectors:

F2-301, F2-302, F2-303, F2-304, F2-305 and F2-306

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
3	Dual Technology Detector F2-303 Series	——
4	Dual Technology Detector F2-304 Series	——

The first samples were received on: December 13, 2005

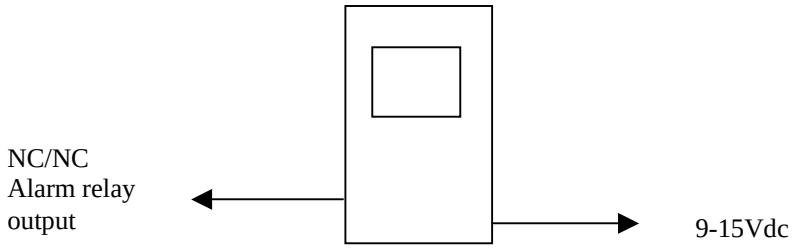
1.3 Theory of Operation

Microwave Motion Sensor Module is developed applying Doppler Radar principle.
The role of Sensor Module is transmitting a low power Microwave from transmitting antenna and receiving the microwave energy reflected by objects to receiving antenna.
If the movement of the object is detected by the microwave motion sensor, the reflected microwave frequency is shifted away from the transmit frequency to receiving antenna.
The reflected and shifted microwave frequency is mixed with the transmit microwave frequency and results a low frequency voltage at the output of the sensor.
The Microwave Motion Sensor Module is designed with Dielectric Resonator Oscillator(DRO).

1.4 Technical Specifications of the EUT

Manufacturer:	Digital Security Controls Ltd.
Operating Frequency:	10.525GHz (F2-301, F2-303, F2-305 models) 10.515GHz (F2-302, F2-304, F2-306 models)
Emission Designator	P0N
Modulation:	On/Off
Antenna Data:	Integral
Power Source:	9-15Vdc

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, 15.245

Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz and 24075-24175 MHz

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.
Spectrum Analyzer	~~Hewlett-~~Packard	8565E	FA000981	March 10/05	March 10/06
Horn Antenna #1	EMCO	3115	FA000649	Dec. 22/04	Dec. 22/05
18.0 – 40.0GHz Horn	EMCO	3116	FA001847	April 25/05	April 25/06
18.0 – 26.0 GHz Amplifier	NARDA	BBS-1826N612	FA001550	COU	COU
26 – 40.0 GHz Amplifier	NARDA	DBL-2640N610	FA001556	COU	COU
40-60GHz Mixer/Antenna	OML	M19HWA (HP)	FA001523	NCR	NCR
Diplexer	OML	DPL.26	FA001522	NCR	NCR
Receiver	Rohde&Schwarz	ESHS 10	FA001918	Feb. 28/05	Feb. 28/06
LISN	EMCO	4825/2	FA001545	March 13/05	March 13/06
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
Transient Limiter	Hewlett-Packard	1194 7A	FA000975	May 25/05	May 25/06

NCR – No Cal Required
COU – Cal on Use

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

The following technical Judgement was made during this assessment:

3.2.1 Technical Judgement 1

The difference between the models of the F2-300 series Motion Detectors is the populated features. The F2-301 and F2-302 have PIR and/or MW detector, the F2-303 and F2-304 have PIR and MW detector and the F2-305 and F2-306 have PIR and MW detector with microphone. It was judged that testing performed on one of each frequency would be representative of all models.

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)	Powerline Conducted Emissions	Y	PASS
15.209(a)	Radiated Emissions within Restricted Bands	N (2)	
15.245(b)	Radiated emissions not in Restricted Bands	Y	PASS

Notes:

(1) EUT is DC powered

(2) The apparatus does not have any harmonics that fall within the restricted bands below 17.7GHz.

Appendix A : Test Results

Clause 15.207(a) Powerline Conducted Emissions

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:

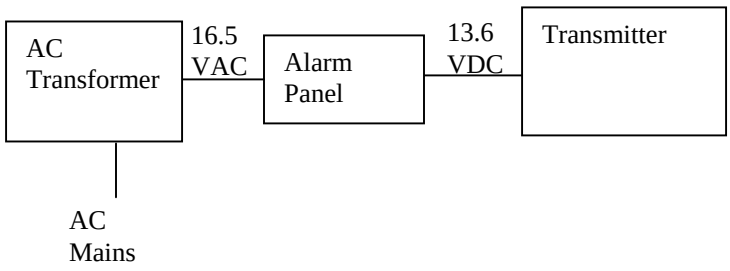
Sample Number:	10	**Temperature:**	22
Date:	January 12, 2006	**Humidity:**	30
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Shielded Room

Test Results: See Attached Plots and Tables.

Additional Observations:

All plots were performed using a peak detector and compared to the average limit.

Block Diagram:



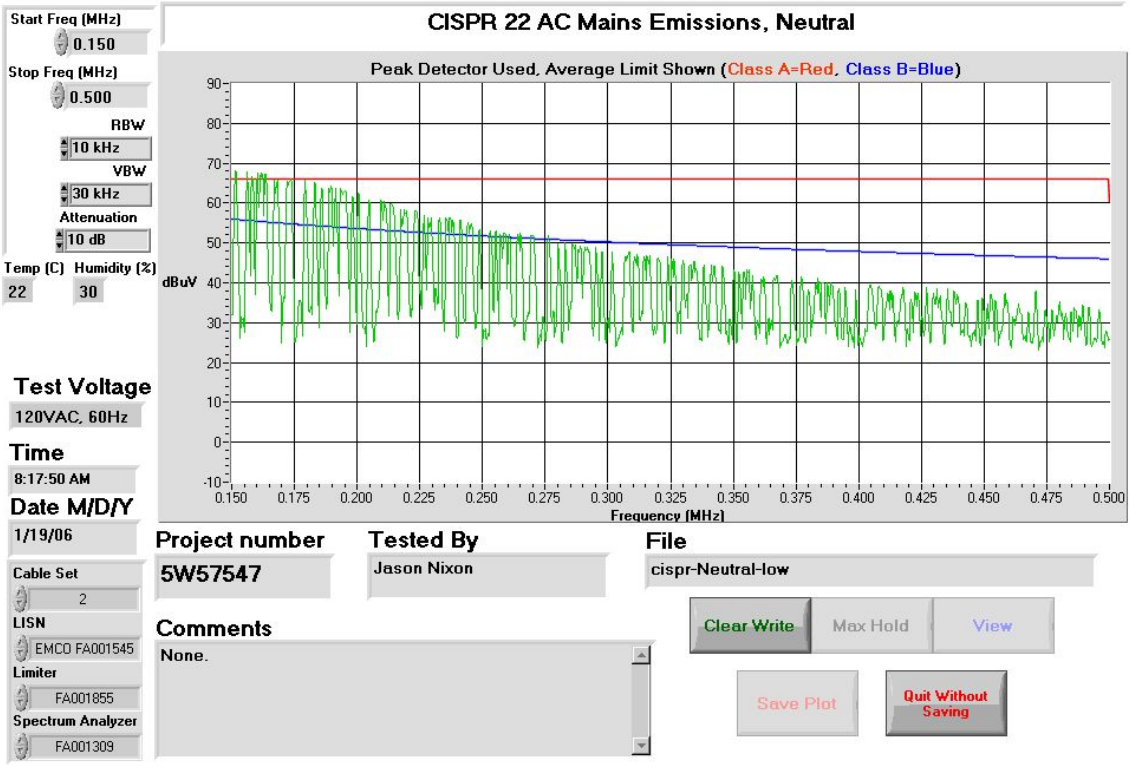
10.515GHz Transmitter

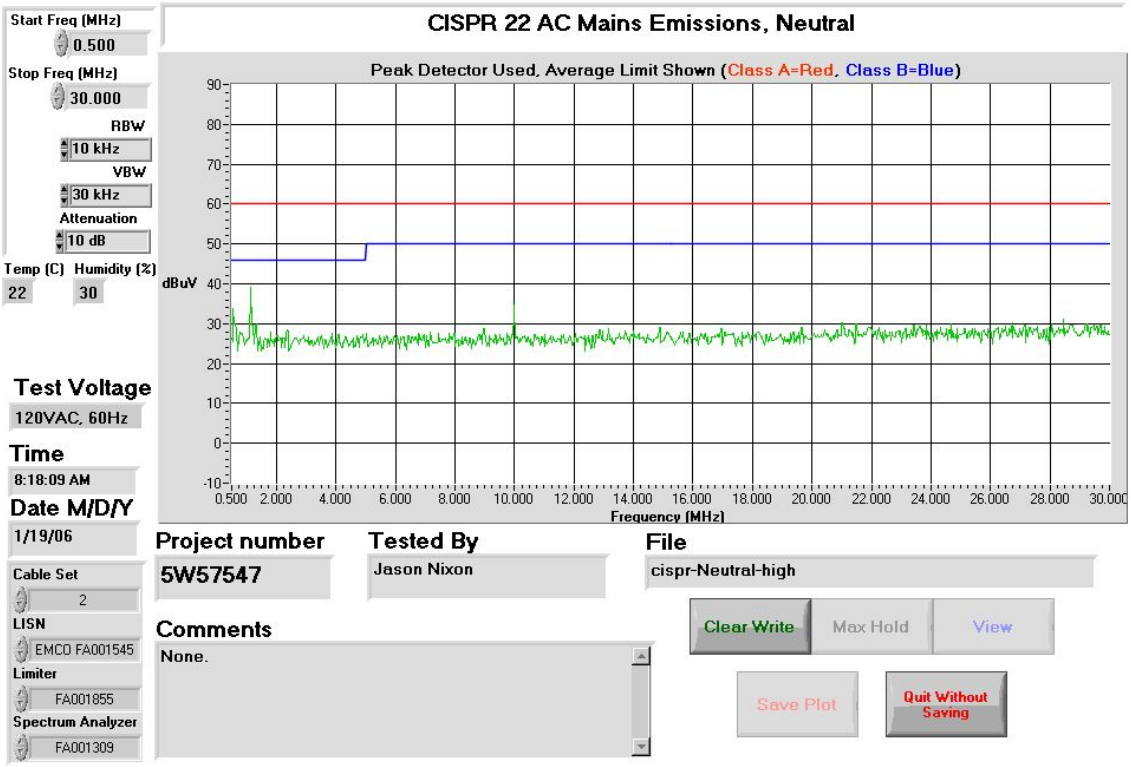
Conductor		Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	Phase	0.1506	Quasi Peak	57.6	0.00	0.06	57.66	66.0	8.3
			Average	26.5	0.00	0.06	26.56	56.0	29.4
2	Phase	0.1572	Quasi Peak	57.3	0.00	0.20	57.50	65.6	8.1
			Average	26.3	0.00	0.20	26.50	55.6	29.1
3	Phase	0.1593	Quasi Peak	57.3	0.00	0.03	57.33	65.5	8.2
			Average	26.0	0.00	0.03	26.03	55.5	29.5
4	Phase	0.1666	Quasi Peak	56.4	0.00	0.00	56.40	65.1	8.7
			Average	25.6	0.00	0.00	25.60	55.1	29.5
5	Phase	0.2665	Quasi Peak	41.8	0.00	0.20	42.00	61.2	19.2
			Average	11.9	0.00	0.20	12.10	51.2	39.1
6	Phase	1.1532	Quasi Peak	1.5	0.00	0.21	1.71	56.0	54.3
			Average	-5.2	0.00	0.21	-4.99	46.0	51.0
7	Neutral	0.1506	Quasi Peak	57.6	0.00	0.06	57.66	66.0	8.3
			Average	26.6	0.00	0.06	26.66	56.0	29.3
8	Neutral	0.1594	Quasi Peak	57.1	0.00	0.04	57.14	65.5	8.4
			Average	26.1	0.00	0.04	26.14	55.5	29.4
9	Neutral	0.1663	Quasi Peak	56.7	0.00	0.00	56.70	65.1	8.4
			Average	25.6	0.00	0.00	25.60	55.1	29.5
10	Neutral	0.1784	Quasi Peak	55.2	0.00	0.08	55.28	64.6	9.3
			Average	24.3	0.00	0.08	24.38	54.6	30.2
11	Neutral	0.2675	Quasi Peak	41.6	0.00	0.20	41.80	61.2	19.4
			Average	11.7	0.00	0.20	11.90	51.2	39.3
12	Neutral	1.1530	Quasi Peak	0.7	0.00	0.21	0.91	56.0	55.1
			Average	-5.2	0.00	0.21	-4.99	46.0	51.0

10.525GHz Transmitter

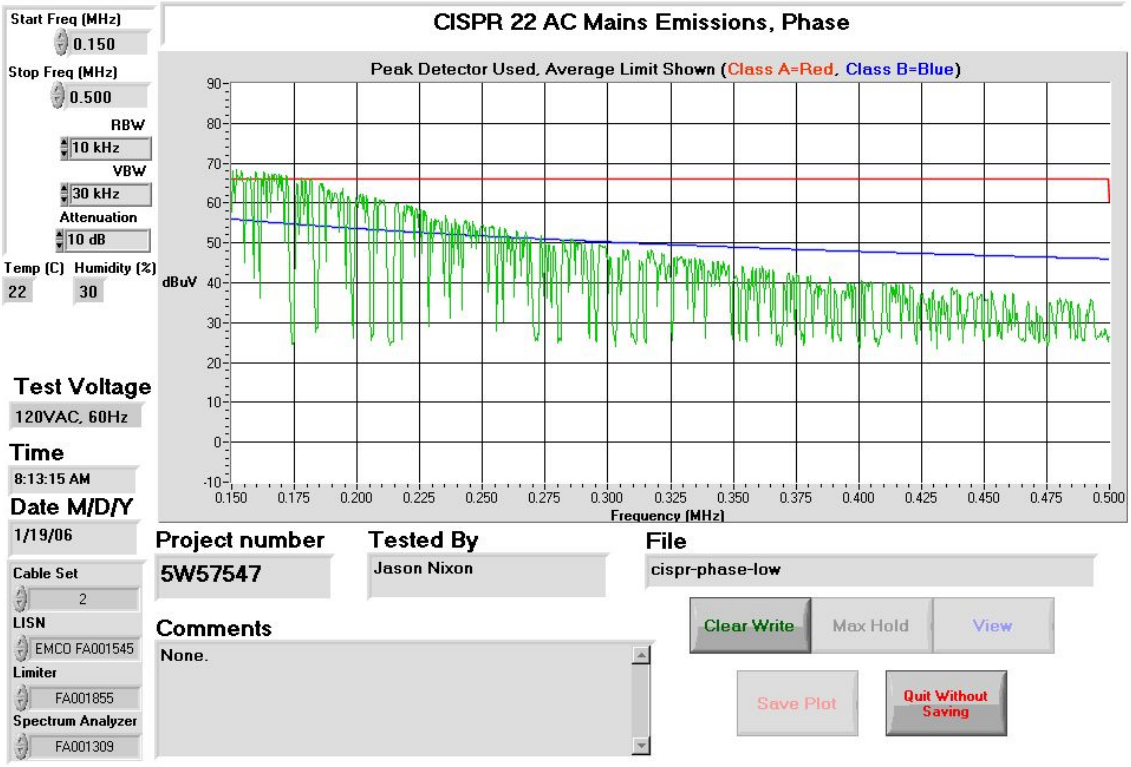
Conductor		Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	Phase	0.1500	Quasi Peak	28.2	0.00	0.00	28.20	66.0	37.8
			Average	26.4	0.00	0.00	26.40	56.0	29.6
2	Phase	0.1571	Quasi Peak	57.1	0.00	0.20	57.30	65.6	8.3
			Average	26.0	0.00	0.20	26.20	55.6	29.4
3	Phase	0.1593	Quasi Peak	57.1	0.00	0.03	57.13	65.5	8.4
			Average	26.0	0.00	0.03	26.03	55.5	29.5
4	Phase	0.1666	Quasi Peak	56.4	0.00	0.00	56.40	65.1	8.7
			Average	25.4	0.00	0.00	25.40	55.1	29.7
5	Phase	0.2665	Quasi Peak	41.9	0.00	0.20	42.10	61.2	19.1
			Average	11.9	0.00	0.20	12.10	51.2	39.1
6	Phase	1.1533	Quasi Peak	1.3	0.00	0.21	1.51	56.0	54.5
			Average	-4.9	0.00	0.21	-4.69	46.0	50.7
7	Neutral	0.1560	Quasi Peak	57.1	0.00	0.19	57.29	65.7	8.4
			Average	26.0	0.00	0.19	26.19	55.7	29.5
8	Neutral	0.1594	Quasi Peak	57.1	0.00	0.04	57.14	65.5	8.4
			Average	25.9	0.00	0.04	25.94	55.5	29.6
9	Neutral	0.1663	Quasi Peak	56.6	0.00	0.00	56.60	65.1	8.5
			Average	25.4	0.00	0.00	25.40	55.1	29.7
10	Neutral	0.1784	Quasi Peak	55.3	0.00	0.08	55.38	64.6	9.2
			Average	24.2	0.00	0.08	24.28	54.6	30.3
11	Neutral	0.2675	Quasi Peak	41.7	0.00	0.20	41.90	61.2	19.3
			Average	11.7	0.00	0.20	11.90	51.2	39.3
12	Neutral	1.1530	Quasi Peak	0.3	0.00	0.21	0.51	56.0	55.5
			Average	-5.1	0.00	0.21	-4.89	46.0	50.9

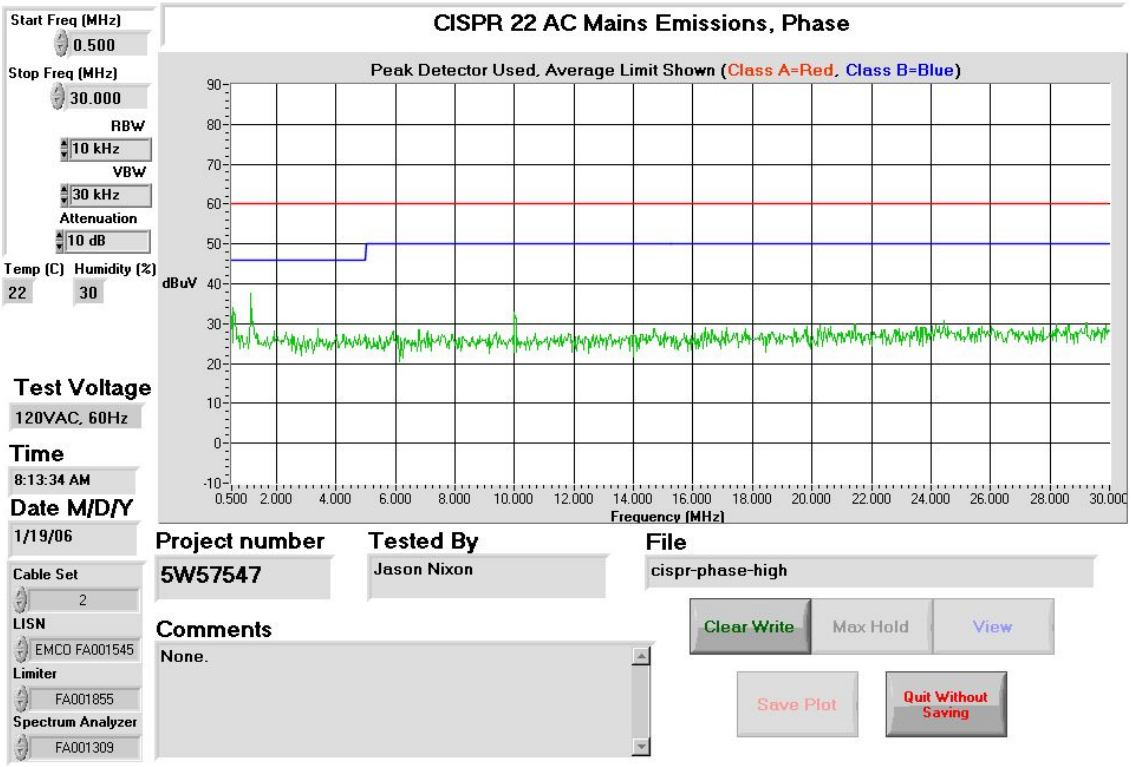
10.515GHz Transmitter – Neutral



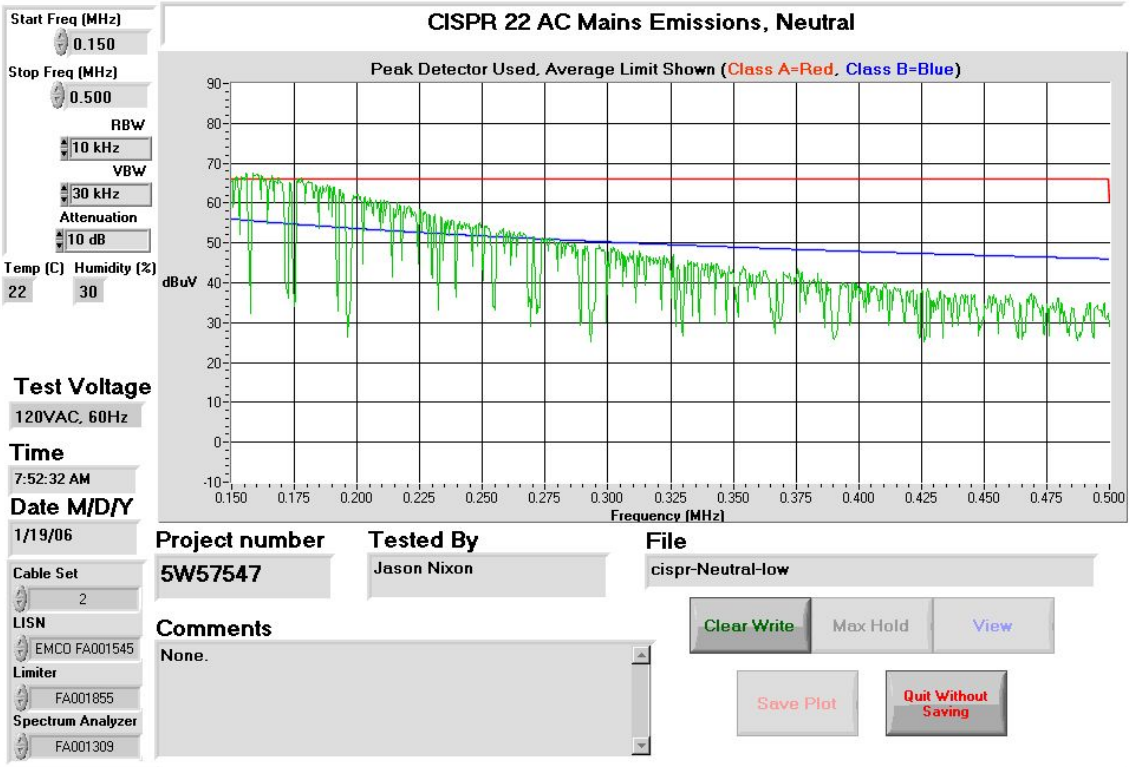


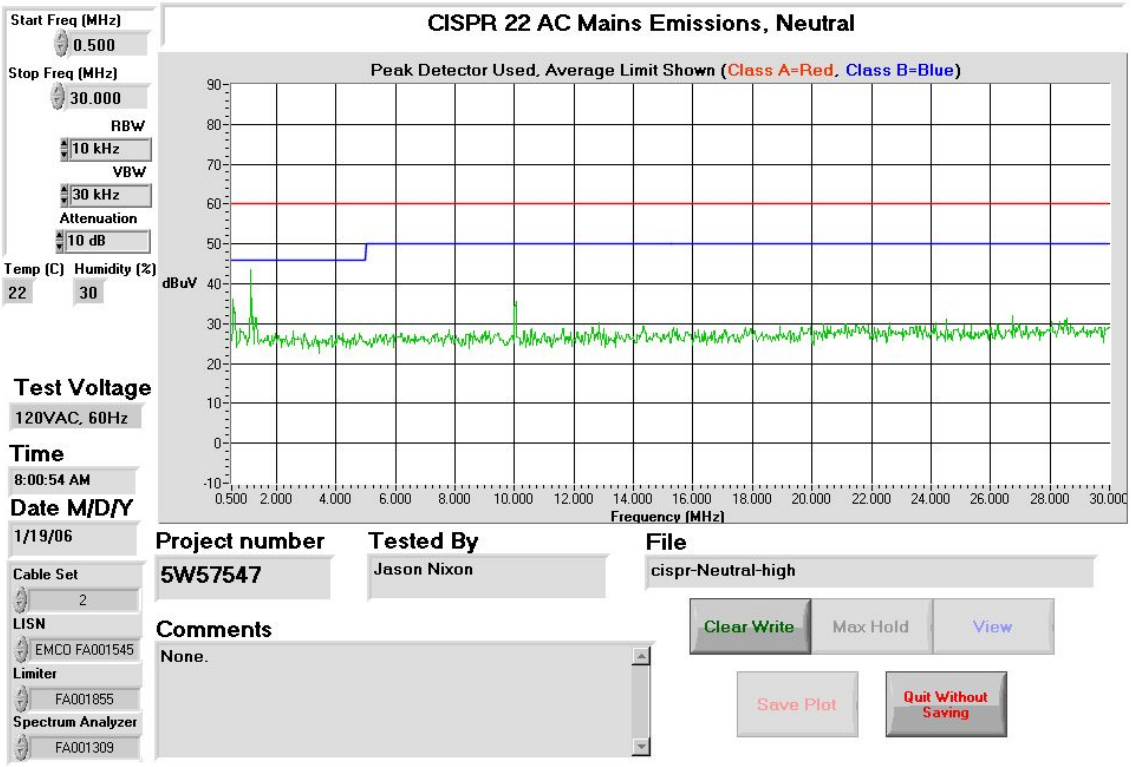
10.515GHz Transmitter – Phase



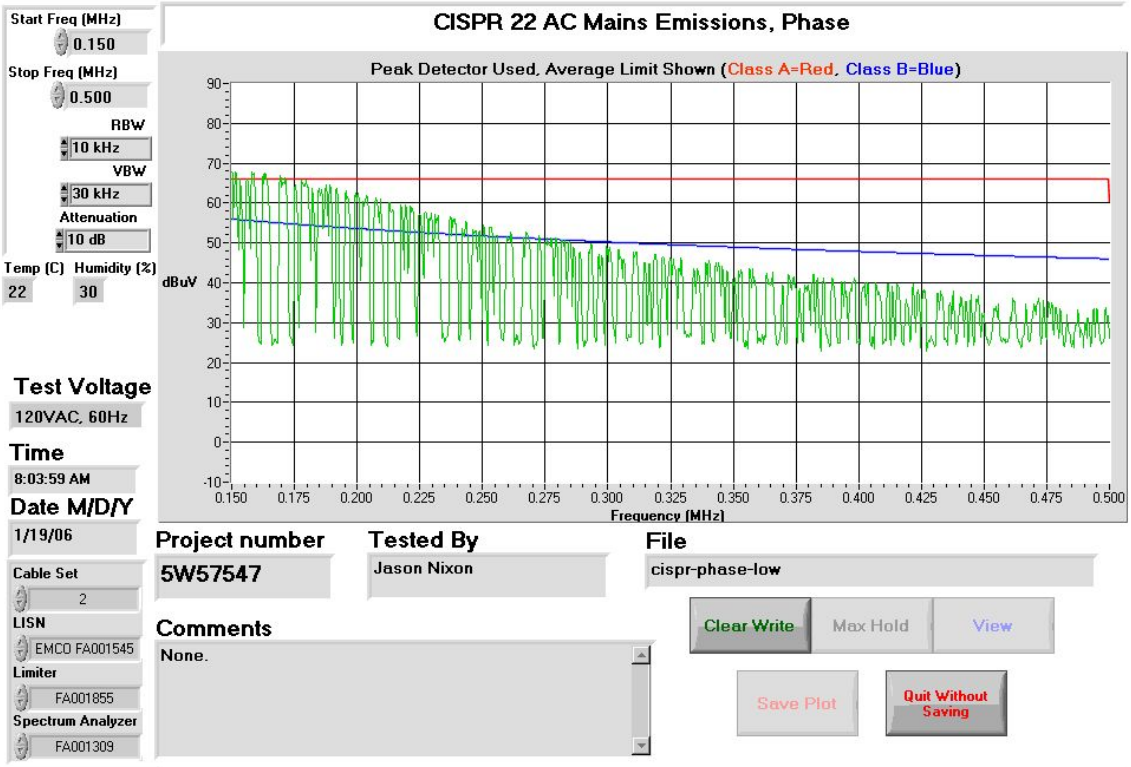


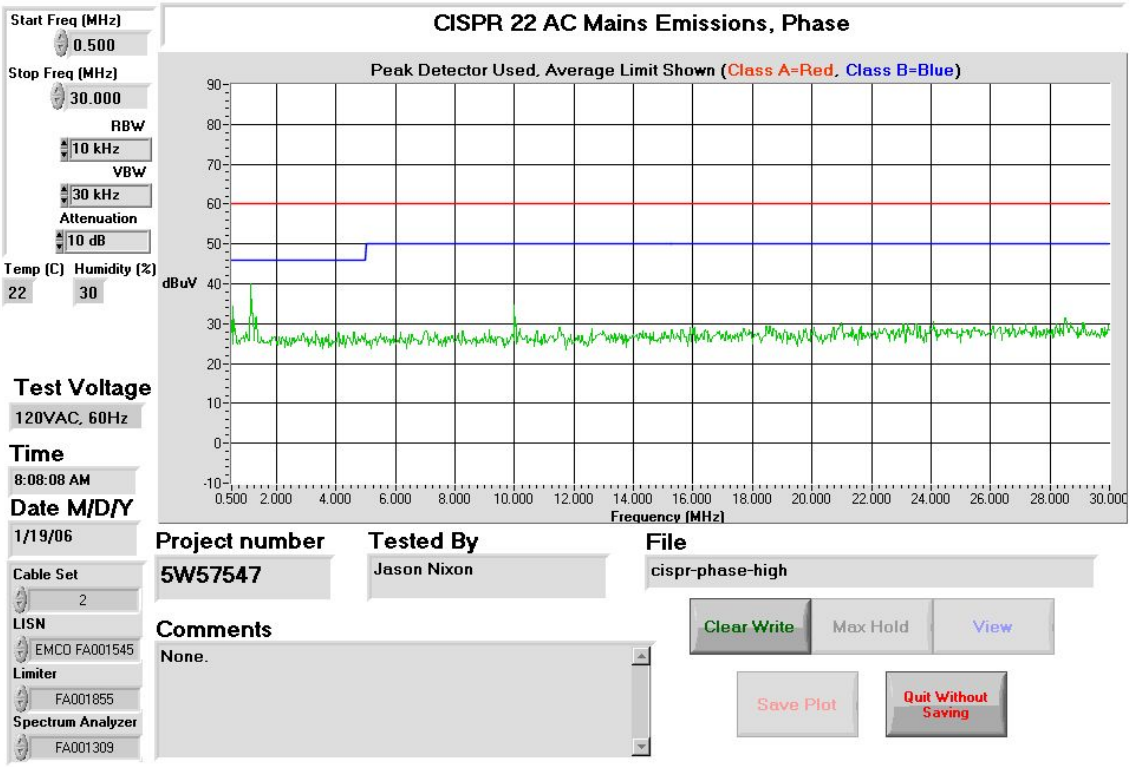
10.525GHz Transmitter – Neutral





10.525GHz Transmitter – Phase





Clause 15.245(b) Radiated emissions not in Restricted Bands

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (millivolts/meter)
902-928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25.0
24075-24175	2500	25.0

Test Conditions:

Sample Number:	3,4	**Temperature:**	25°C
Date:	December 15, 2005	**Humidity:**	10%
Modification State:	0	**Tester:**	Jason Nixon
		Laboratory:	Telecom 2

Test Results: See attached Table

Additional Observations:

The Spectrum was searched from 30MHz to the 53GHz.

The EUT was measured on three orthogonal axis.

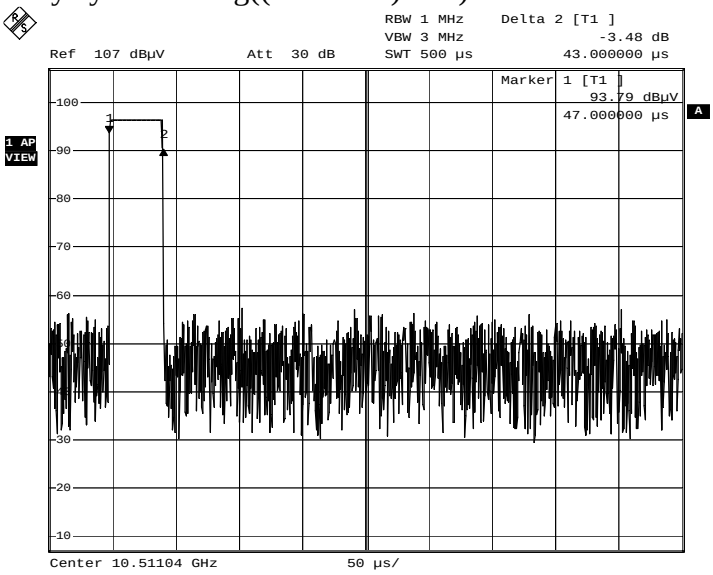
All measurements below 40GHz were performed at 1m and then corrected to 3m. All measurements above 40GHz were performed at 30cm and corrected to 3m.

The supply voltage was varied from 9Vdc to 15Vdc and no change in transmit field strength was observed.

	Frequency (MHz)	Antenna	Polarity	RCVD Signal (dBuV)	Ant. Factor (dB)	Amp. Gain / Cable Loss (dB)	Duty Cycle Corr.	Distance Correction	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10511.000	Horn1	V	85.8	38.7	-2.8	32.5	9.5	117.9	148.0	30.1	Peak
									85.4	128.0	42.6	Average
2	10511.000	Horn1	H	84.2	38.9	-2.8	32.5	9.5	116.4	148.0	31.6	Peak
									83.9	128.0	44.1	Average
3	21022.000	40GHz Horn	V	96.3	45.9	39.8	32.5	9.5	92.9	108.0	15.1	Peak
									60.4	88.0	27.6	Average
4	21022.000	40GHz Horn	H	95.0	45.8	39.8	32.5	9.5	91.4	108.0	16.6	Peak
									58.9	88.0	29.1	Average
5	31533.000	40GHz Horn	V	76.9	47.3	23.3	32.5	9.5	91.4	108.0	16.6	Peak
									58.9	88.0	29.1	Average
6	31533.000	40GHz Horn	H	72.2	47.1	23.3	32.5	9.5	86.4	108.0	21.6	Peak
									53.9	88.0	34.1	Average
7	10522.000	Horn1	V	87.2	38.8	-2.8	32.5	9.5	119.2	148.0	28.8	Peak
									86.7	128.0	41.3	Average
8	10522.000	Horn1	H	86.8	38.9	-2.8	32.5	9.5	119.1	148.0	28.9	Peak
									86.6	128.0	41.4	Average
9	21044.000	40GHz Horn	V	92.7	45.9	39.8	32.5	9.5	89.3	108.0	18.7	Peak
									56.8	88.0	31.2	Average
10	21044.000	40GHz Horn	H	92.0	45.8	39.8	32.5	9.5	88.5	108.0	19.5	Peak
									56.0	88.0	32.0	Average
11	31566.000	40GHz Horn	V	81.7	47.4	23.3	32.5	9.5	96.2	108.0	11.8	Peak
									63.7	88.0	24.3	Average
12	31566.000	40GHz Horn	H	81.7	47.1	23.3	32.5	9.5	96.0	108.0	12.0	Peak
									63.5	88.0	24.5	Average
13	42088.000	40-60GHz Horn	V/H	58.2	39.8	N/A	32.5	40.0	58.0	108.0	50.0	Peak
									25.5	88.0	62.5	Average

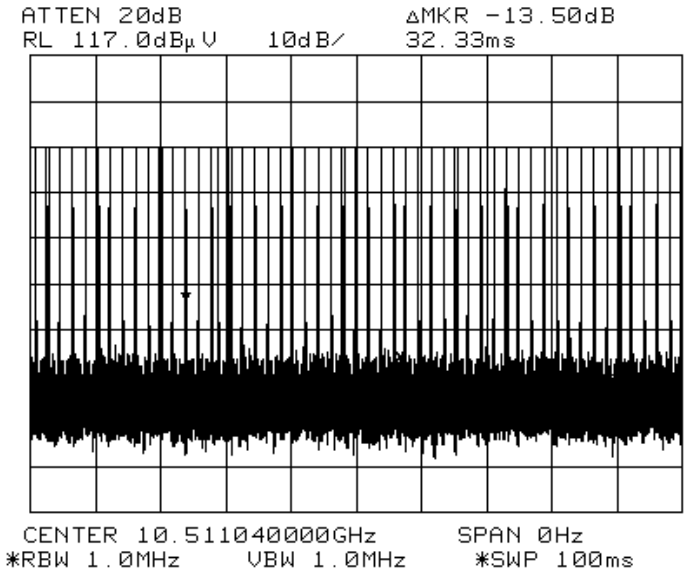
Duty Cycle Correction:

Duty cycle = 20log((0.043*55)/100) = -32.5dB



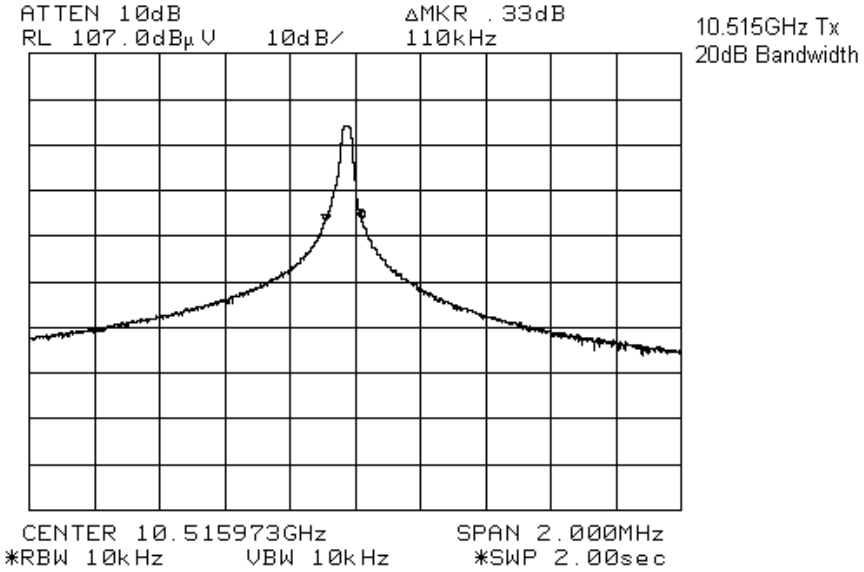
Pulse On Time

Date: 14.DEC.2005 16:54:34

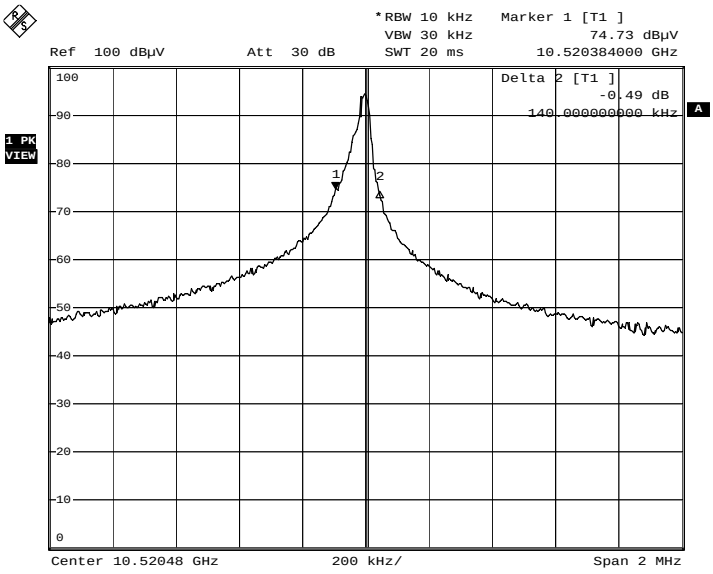


Number of Pulses in 100msec
55 pulses

20dB Bandwidth
10.515GHz transmitter



10.525GHz Transmitter

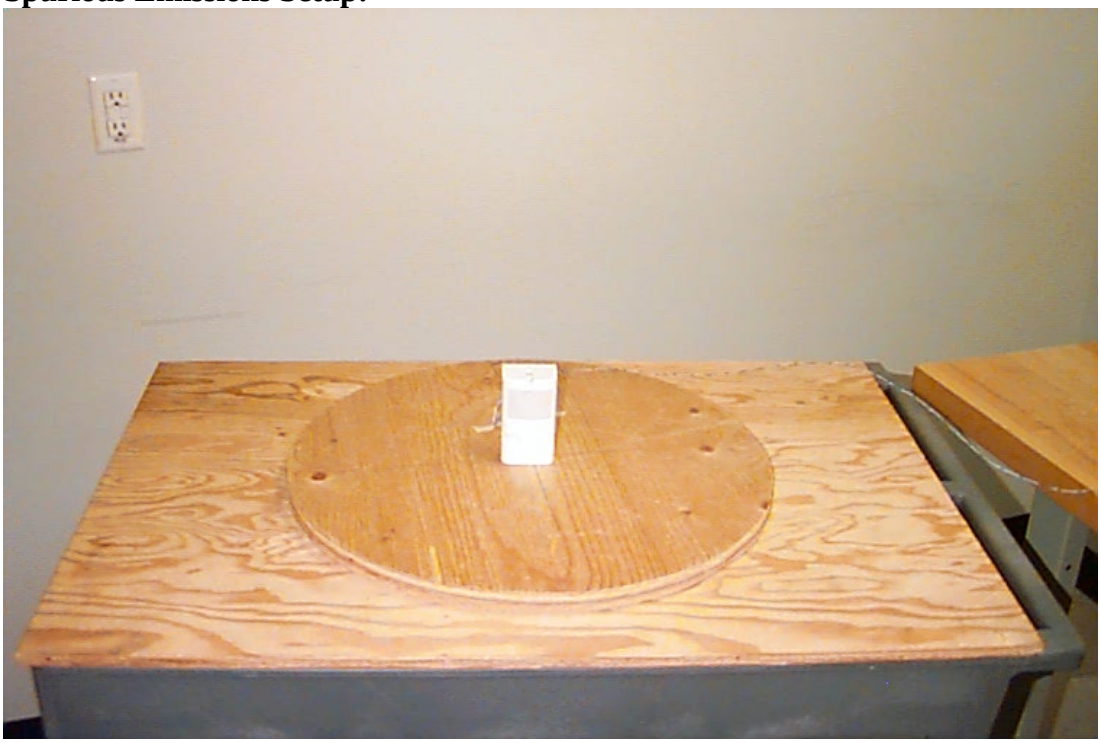


20dB Bandwidth

Date: 31.JAN.2006 19:50:03

Appendix B : Setup Photographs

Spurious Emissions Setup:



Conducted Emissions Setup:

Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions