



Test Report:

2W06114

Applicant:

PARADOX SECURITY SYSTEMS
780 Industrial Blvd
St-Eustache, Québec
Canada, J7R 5V3

**Equipment Under Test:
(EUT)**

1759EX

In Accordance With:

**FCC 47 CFR Part 15, Subpart B: 1999
Class B Certification, Including FCC ET Dockets 98-80
(FCC-02-157)**

Tested By:

Nemko Canada Inc.
303 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

A handwritten signature in blue ink, appearing to read "G. Westwell".

Authorized By:

G. Westwell, Wireless Technologist

Date:

22 August 2002

Total Number of Pages:

26

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EQUIPMENT: 1759EX

Section 1. Summary of Test Results

General:

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart B for Class B Digital Devices.

These tests were conducted using measurement procedures of ANSI C63.4-1992.

The equipment was tested for conducted emissions from 0.15 MHz to 30 MHz using a 50 microhenry line impedance stabilization network (L.I.S.N.) as described in ANSI C63.4-1992. Peripheral equipment was also operated through a 50 microhenry L.I.S.N.

Abstract:

Name Of Test	Para. No.	Results
Conducted Emissions	FCC ET Dockets 98-80 (FCC-02-157)	Complied
Radiated Emissions	15.109	Complied

THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. The EUT is not sold with a AC/AC adapter. Refer to Equipment Configuration for details regarding the AC/AC adapter used during testing.



Test Performed By: _____
 Kevin Carr, EMC Specialist

Date: 22 August 2002

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EQUIPMENT: 1759EX

Measurement Uncertainty

Accuracy of Measurement

The measurement uncertainty was calculated using the methods described in NAMAS document NIS81 May 1994, with the confidence level of 95%.

Radiated Measurements

OATS #1 (A) 3 meter [UN9902B]

Contribution	Distribution	Uncertainty (+/-)
Field Strength Variation	Random	0.2089 dB μ V ²
Measurement Equipment	Normal	0.3275 dB μ V ²
Measurement Equipment	Rectangular	0.4167 dB μ V ²
Total Combined Uncertainty		0.9762 dB μ V ²

Expanded Uncertainty @ 95% Confidence = ± 2.0013 dBmV

OATS #1 (B) 10 meter [UN9906B]

Contribution	Distribution	Uncertainty (+/-)
Field Strength Variation	Random	0.1388 dB μ V ²
Measurement Equipment	Normal	0.3275 dB μ V ²
Measurement Equipment	Rectangular	0.4167 dB μ V ²
Total Combined Uncertainty		0.9694 dB μ V ²

Expanded Uncertainty @ 95% Confidence = ± 1.926 dBmV

OATS #2 (B) 3 meter [UN9912B]

Contribution	Distribution	Uncertainty (+/-)
Field Strength Variation	Random	0.4516 dB μ V ²
Measurement Equipment	Normal	0.3275 dB μ V ²
Measurement Equipment	Rectangular	0.4167 dB μ V ²
Total Combined Uncertainty		1.0935 dB μ V ²

Expanded Uncertainty @ 95% Confidence = ± 2.2417 dBmV

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Radiated Measurements, continued

OATS #2 (C) 10 meter [UN9917B]

Contribution	Distribution	Uncertainty (+/-)
Field Strength Variation	Random	0.1211 dB μ V ²
Measurement Equipment	Normal	0.3275 dB μ V ²
Measurement Equipment	Rectangular	0.4167 dB μ V ²
Total Combined Uncertainty		0.9302 dB μ V ²

Expanded Uncertainty @ 95% Confidence = ± 1.9069 dBmV

Conducted Measurements

Shielded Room #1 [UN9920]

Contribution	Distribution	Uncertainty (+/-)
Amplitude Variation	Random	0.0400 dB μ V ²
Measurement Equipment	Normal	0.7500 dB μ V ²
Measurement Equipment	Rectangular	0.2500 dB μ V ²
Total Combined Uncertainty		1.0198 dB μ V ²

Expanded Uncertainty @ 95% Confidence = ± 2.0396 dBmV

EQUIPMENT: 1759EX

Section 2. Equipment Under Test (EUT)

Brand Name: SPECTRA

Manufacturer: PARADOX SECURITY SYSTEMS

Model No.: 1759EX

Serial No.: None

Primary Power: 120VAC, 60Hz with 12VDC battery back-up

Receive Frequency: 433.92MHz-Fixed

Crystal Frequencies: 8, 16 and 70.536MHz

Date Received In Laboratory: 5 July 2002

Nemko Identification No.: 2R06113, Item 2

 Production Unit Pre-Production Unit

Description of EUT

The 1759(EX) Is a control card for a burglar Alarm Panel. It incorporates a 433MHz receiver.

Modifications Incorporated in EUT

The EUT was not modified from what is described by the brand name and unique type identification stated above.

EQUIPMENT: 1759EX

Theory of Operation

The SPECTRA 1759EX is a control panel for a burglar and fire warning systems with built-in wireless remote control receiver. The SPECTRA 1759EX can be programmed with access keypads or by software through direct or telephone connection to a personal computer.

EQUIPMENT: 1759EX

Justification

The EUT was configured for testing as per typical installation. Position and bundling of cables were investigated to establish maximum amplitude of emissions.

The following combinations were investigated to establish worst case configuration:

- (1) The EUT was tested a per a typical installation

Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use. Test S/W Ver. was not supplied by client.

Exercise Mode:

- (1) Away Mode

EQUIPMENT: 1759EX

Section 3. Equipment Configuration

Equipment Configuration List:

Item	Description	FCC ID	Model No.	Serial No.	Rev.
(A)	Control Board		1759EX	None	
(B)	DC Feed and Ring-up unit		CLI-043	FA000194	
(C)	Keypad		1641ENG	None	
(D)	AC/AC Converter (lab. Supplied)		ATC-Frost, FTC3716	None	

Equipment Ports:

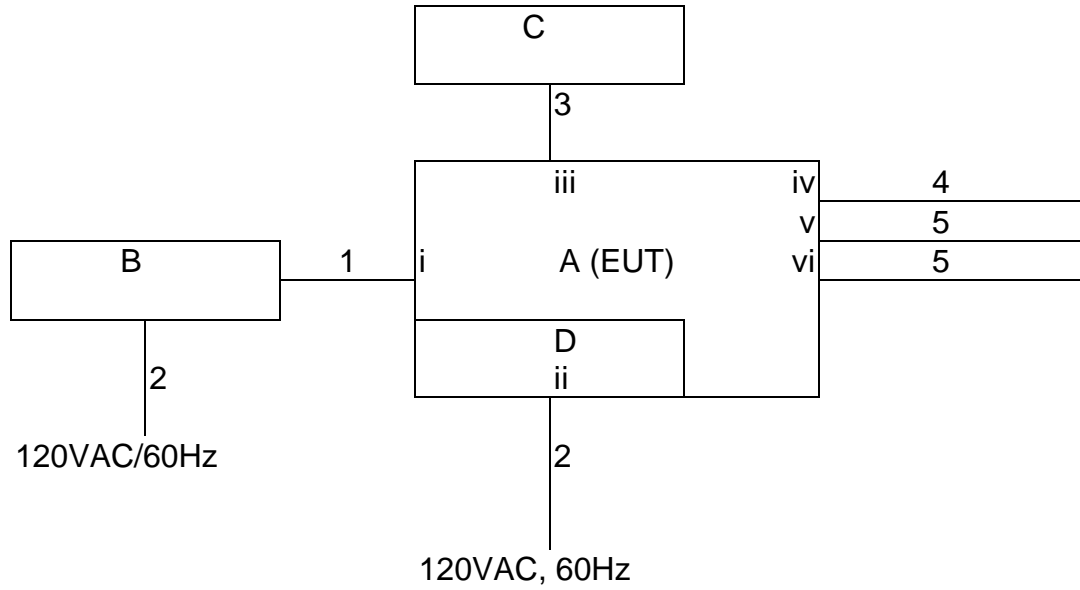
Item	Description	Number
(i)	POT S	1
(ii)	AC input	1
(iii)	Com Buss	1
(iv)	Bell	1
(v)	Zone	1
(vi)	Zone	1

Inter-Connection Cables:

Item	Description	Length (m)
(1)	22 AWG, 4C, UTP	3
(2)	Std North American Power Cord	2
(3)	22 AWG, 4C, UTP, 1K ohm Bell Resistor	10
(4)	22 AWG, 4C, UTP, 2X 1K ohm zone resistor	10
(5)	22 AWG, 4C, UTP, 2X 1K ohm zone resistor	10

EQUIPMENT: 1759EX

Configuration of the Equipment Under Test (EUT)



EQUIPMENT: 1759EX

Section 4. Conducted Emissions

Para. No.: FCC ET Dockets 98-80 (FCC-02-157)

Test Performed By: Kevin Carr	Date of Test: 5 July 2002
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Test Conditions: Test Voltage: 120VAC
 Temperature: 23°C
 Humidity: 36%

Minimum Standard:

Frequency Range MHz	Limits for Conducted Disturbance at a Mains Ports of Class B		
	Quasi-Peak Limits dB (µV/m)	Average Limits dB (µV/m)	Required
0.15 to 0.5	66 to 56	56 to 46	<input checked="" type="checkbox"/>
0.5 to 5	56	46	<input checked="" type="checkbox"/>
5 to 30	60	50	<input checked="" type="checkbox"/>
Frequency Range MHz	Limits for Conducted Disturbance at a Mains Ports of Class A		
	Quasi-Peak Limits dB (µV/m)	Average Limits dB (µV/m)	Required
0.15 to 0.5	79	66	<input type="checkbox"/>
0.5 to 30	73	60	<input type="checkbox"/>

Notes:
 FCC R&) 898-80
 The lower limit shall apply at the transition frequency.
 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz for Class B

Test Results: Complied. See attached graphs and table.

Measurement Data: See attached graphs and table.

Method Of Measurement: (Procedure CISPR-22)

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak detector. Any emissions that were close to the limit were measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak detector.

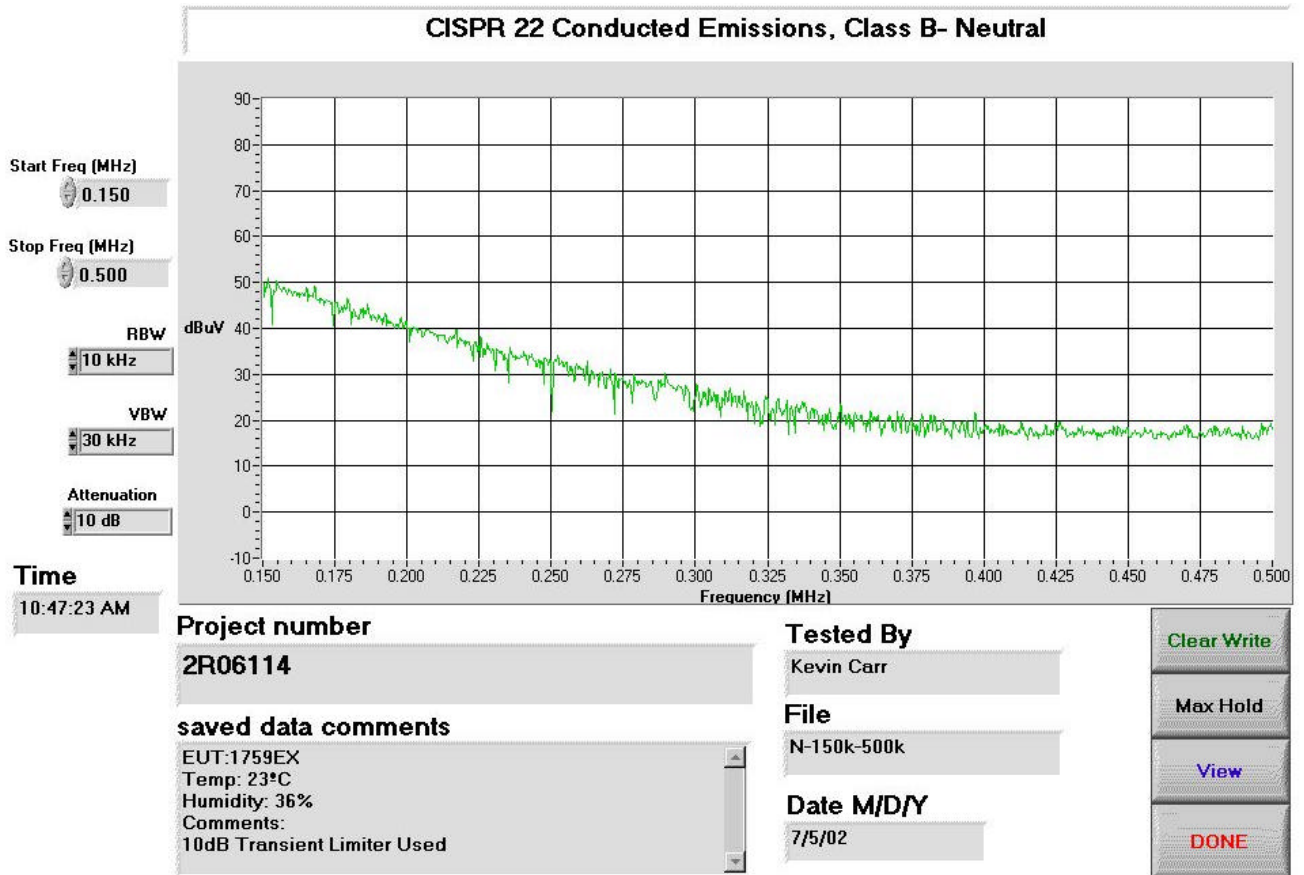
All emissions within 10 dB of limit have been recorded.

EQUIPMENT: 1759EX

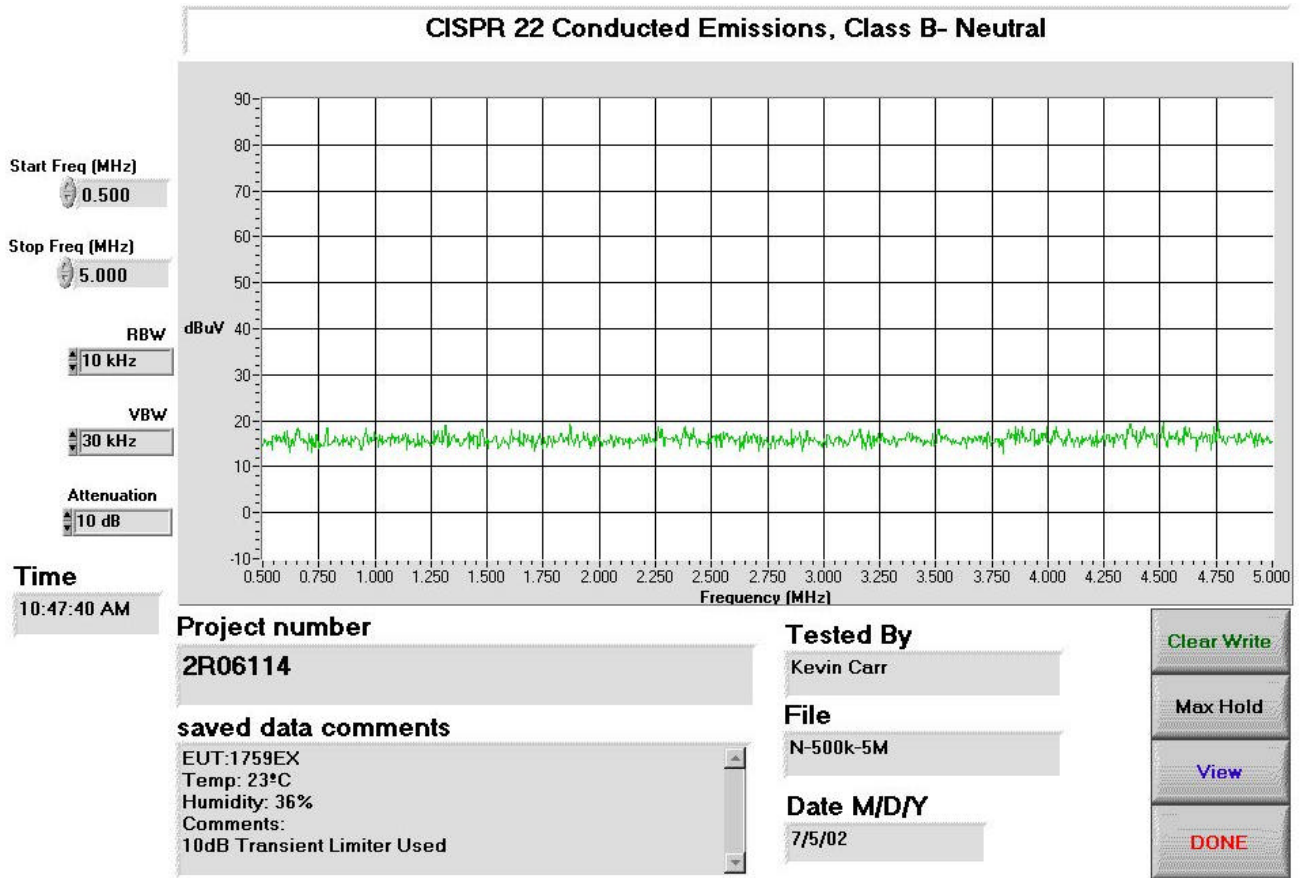
Measurement Data

Tested as per Table Top <input checked="" type="checkbox"/>				Tested as per Floor Standing <input type="checkbox"/>		
The top six emissions have been recorded/plotted.						
No.	Conductor	Frequency (MHz)	Detector	Level (dBµV)	Limit (dBµV)	Margin (dB)
1	Phase	0.15	Quasi-Peak	51.6	66	14.4
	Phase	0.15	Average	1	56	55
2	Phase	0.2	Quasi-Peak	43	63.6	20.6
	Phase	0.2	Average	20.3	53.6	33.3
3	Phase	16	Quasi-Peak	45.4	60	14.6
	Phase	16	Average	43.2	50	6.8
4	Neutral	0.15	Quasi-Peak	51.4	66	14.6
	Neutral	0.15	Average	0.3	56	55.7
5	Neutral	0.2	Quasi-Peak	43.3	63.6	20.3
	Neutral	0.2	Average	20.3	53.6	33.3
6	Neutral	16	Quasi-Peak	44.3	60	15.7
	Neutral	16	Average	42.7	50	7.3
Notes:						

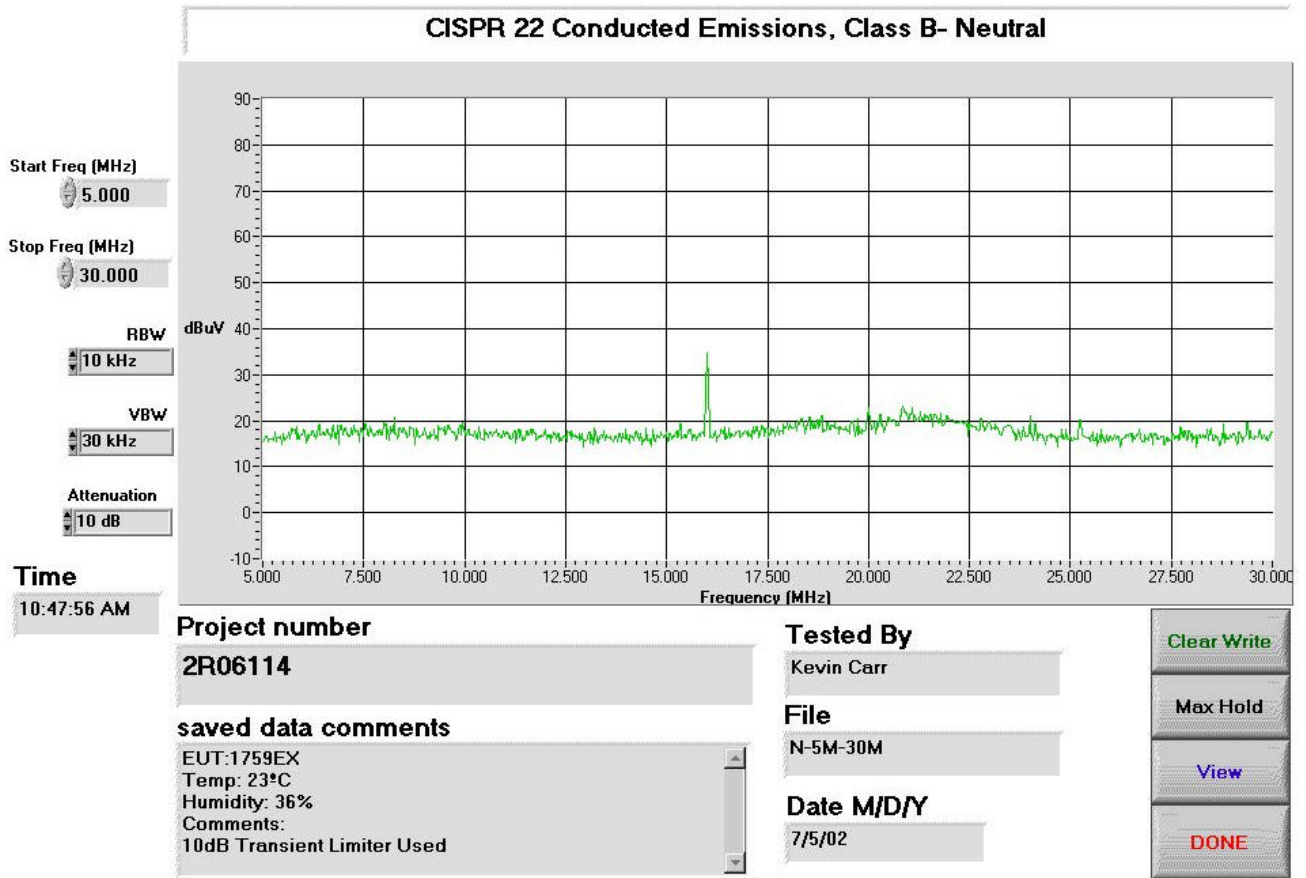
EQUIPMENT: 1759EX



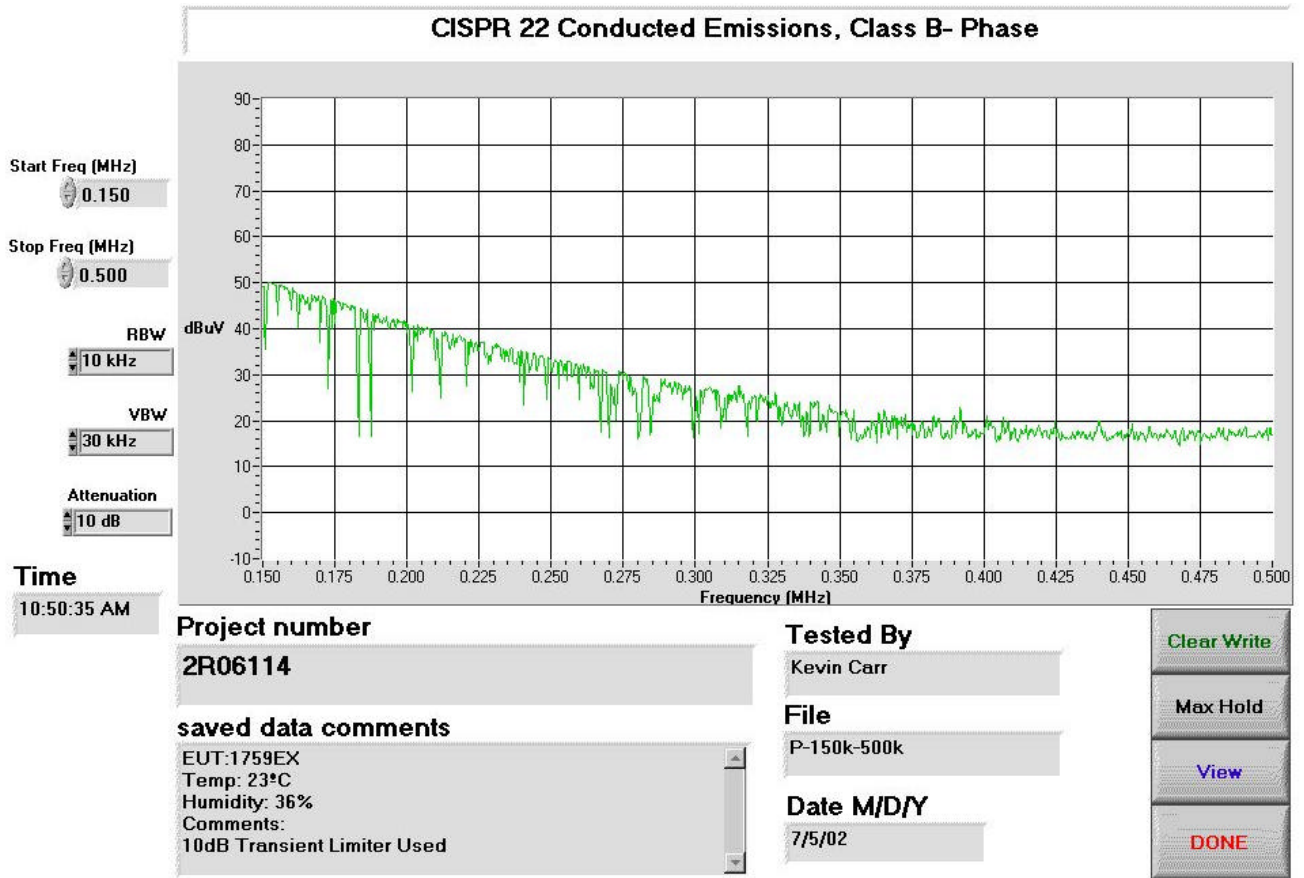
EQUIPMENT: 1759EX



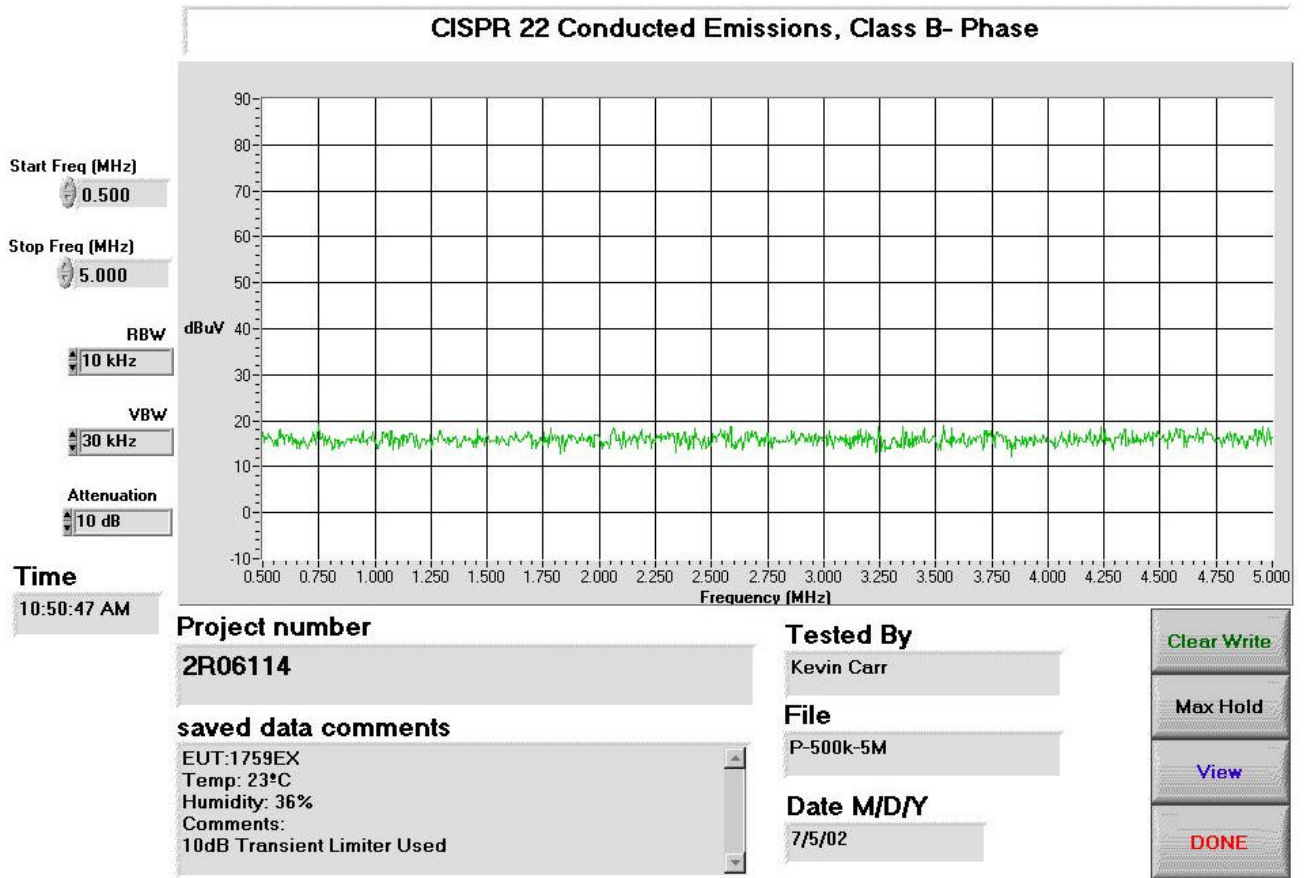
EQUIPMENT: 1759EX



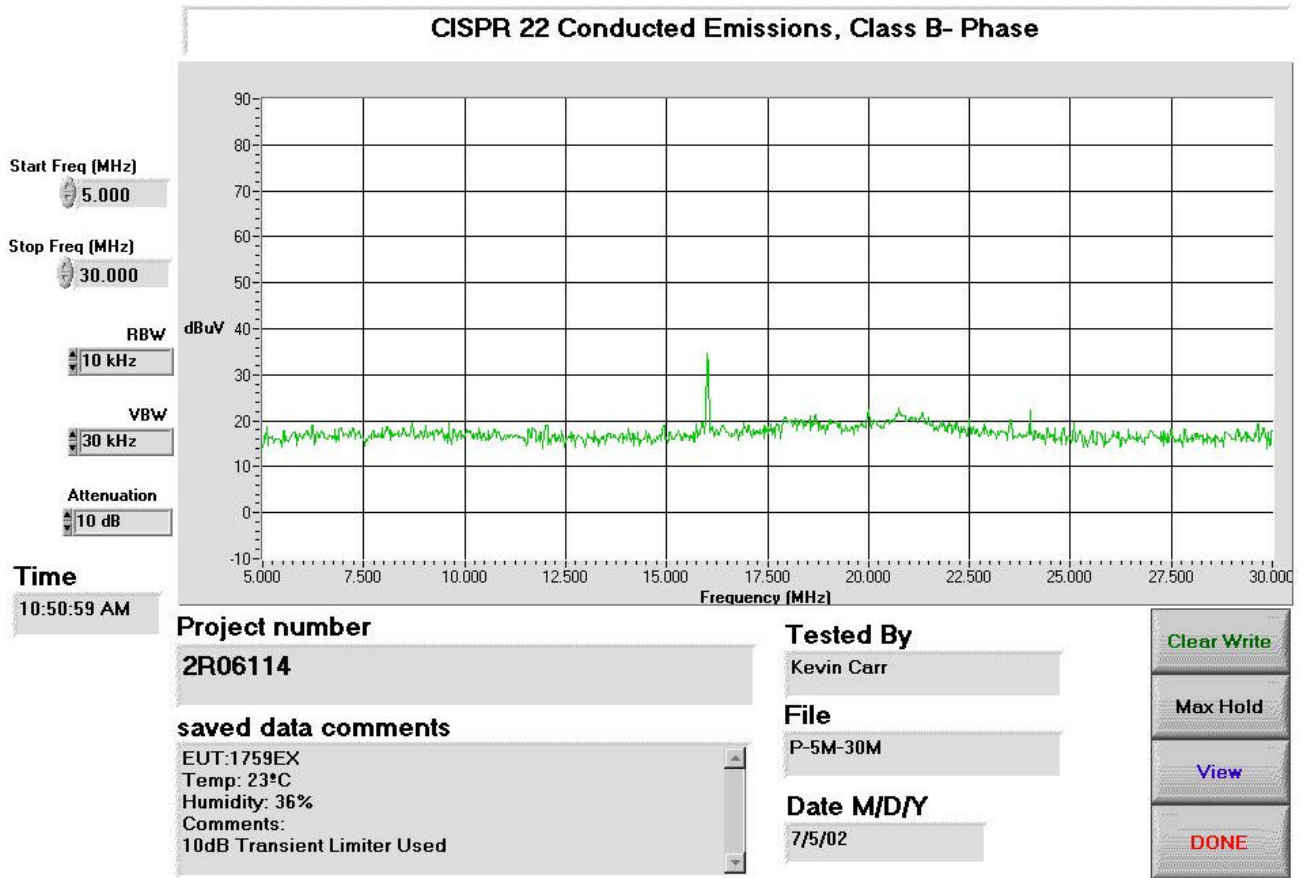
EQUIPMENT: 1759EX



EQUIPMENT: 1759EX



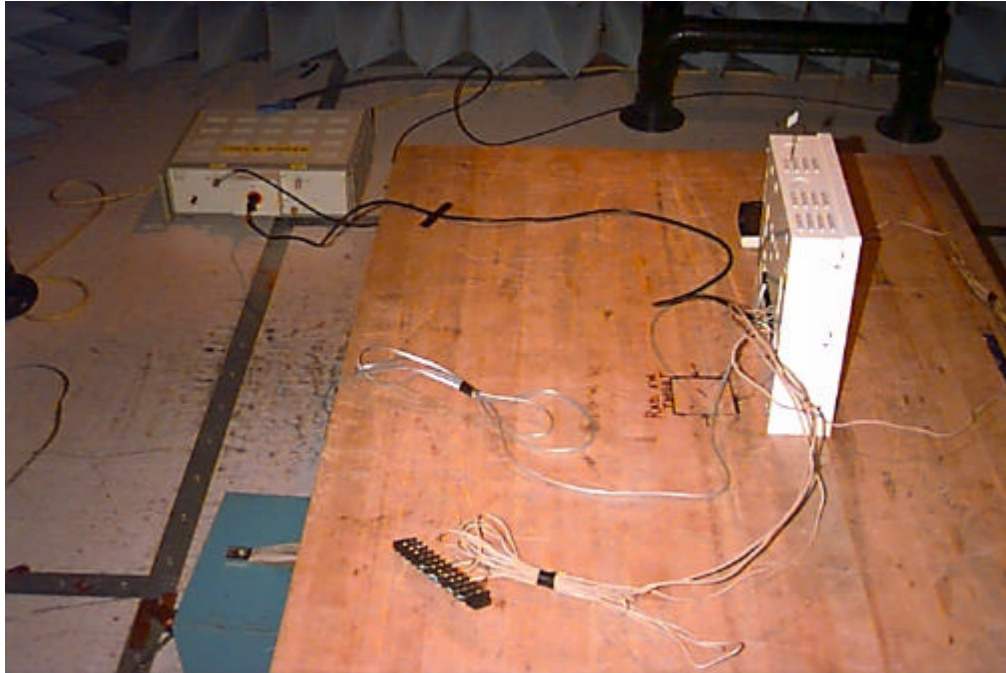
EQUIPMENT: 1759EX



EQUIPMENT: 1759EX

Conducted Photographs

Side View



Front View



EQUIPMENT: 1759EX

Section 5. Radiated Emissions

Para. No.: 15.109

Test Performed By: Kevin Carr	Date of Test: 8 July 2002
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Test Conditions: Test Voltage: 120VAC
Temperature: 28°C
Humidity: 65%

Minimum Standard:

Frequency (MHz)	Maximum Field Strength at 3m	
	µV/m	dBµV/m
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test Results: Complied. The worst-case emission level was 39.2 dBµV/m @ 3m at 423.2 MHz. This was 6.8 dB below the specification limit.

EQUIPMENT: 1759EX

Measurement Data:

The equipment was prescanned in a shielded room using a spectrum analyzer and broadband antenna. A list of frequencies was compiled for investigation in the open field. The equipment was then moved to an open area test site where amplitude measurements were made at a distance of 3 meters. The bandwidth was set to 120 kHz and the detector function was CISPR Quasi-Peak. Any emission within 3 dB of the specification limit is re-measured using a reference tuned dipole antenna per ANSI C63.4.

Emissions detected above 1 GHz were measured with horn antenna and low noise pre-amplifier at a distance of 3 meters.

The spectrum was investigated from 30MHz up to the frequency shown in the following table.

Highest Frequency Generated or Used in the Device Which the Device Operates or Tunes (MHz)	Upper Frequency of Measurement Range (MHz)
Below 1.075	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower.

The highest operational frequency used in the EUT was 423.22 MHz.

The top six (6) emissions within 20 dB of the limit have been recorded.

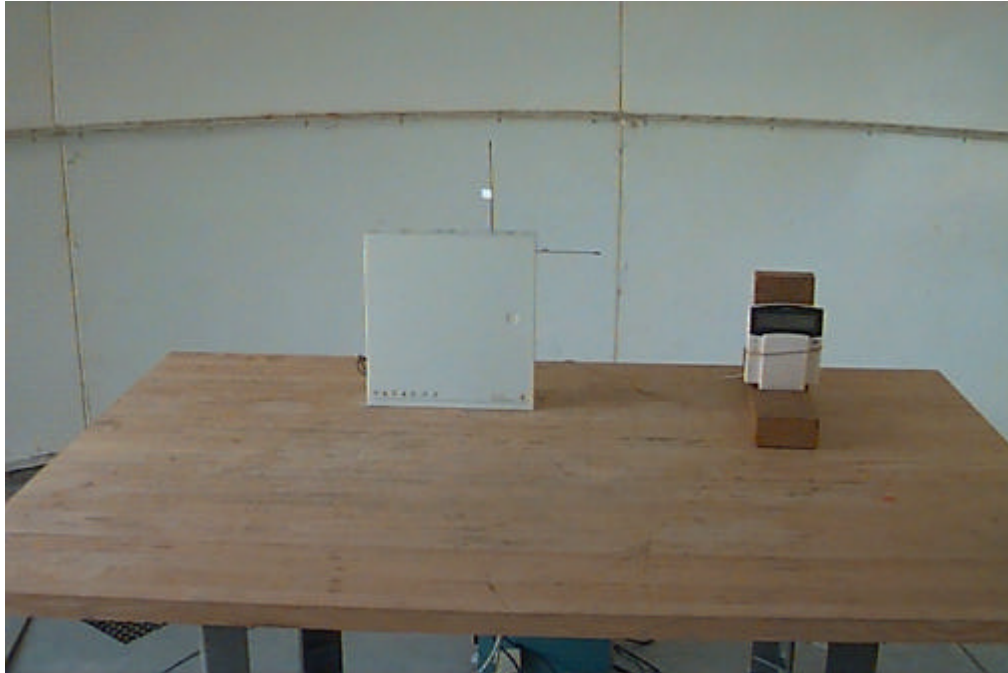
Test Data - Radiated Emissions

Tested as per Table Top <input checked="" type="checkbox"/>				Tested as per Floor Standing <input type="checkbox"/>						
The top six emissions within 20 dB of the limit have been recorded.										
All pre-scan data can be found at the back of this report.										
Test Distance (meters):		3		Receiver:		ESVP		Range:		A
Detector:		CISPR		RBW(kHz):		120		Environmental Factors:		None
No.	Freq. (MHz)	Ant.	Pol (V/H)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	48.01	B/C1	V	19.9	11.7			31.6	40	8.4
2	40	B/C1	V	17	12.7			29.7	40	10.3
3	423.2	L/P1	V	20.2	19			39.2	46	6.8
4	846.44	L/P1	H	8.6	27			35.6	46	10.4
5	32	B/C1	V	16.9	13.8			30.7	40	9.3
6	56	B/C1	V	19.7	10.6			30.3	40	9.7
<p>Notes:</p> <p>B/C = Biconical, BL = Bilog, L/P = Log-Periodic, H = Horn, D/P = Dipole, E/D = EMCO Dipole</p> <p>* Re-measured using dipole antenna.</p> <p>** Includes cable loss when amplifier is not used.</p> <p>*** Includes cable loss.</p> <p>() Denotes failing emission level.</p> <p>N.D. = Not Detected</p>										

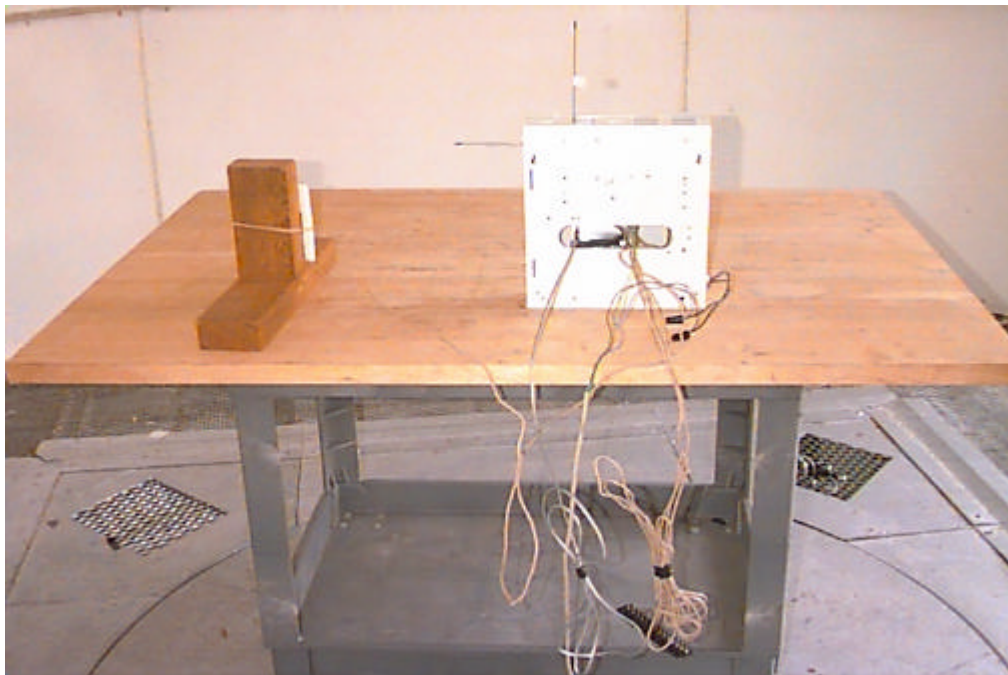
EQUIPMENT: 1759EX

Radiated Photographs

Front View



Rear View



EQUIPMENT: 1759EX

Section 6. Sample Calculations

Radiated Emissions

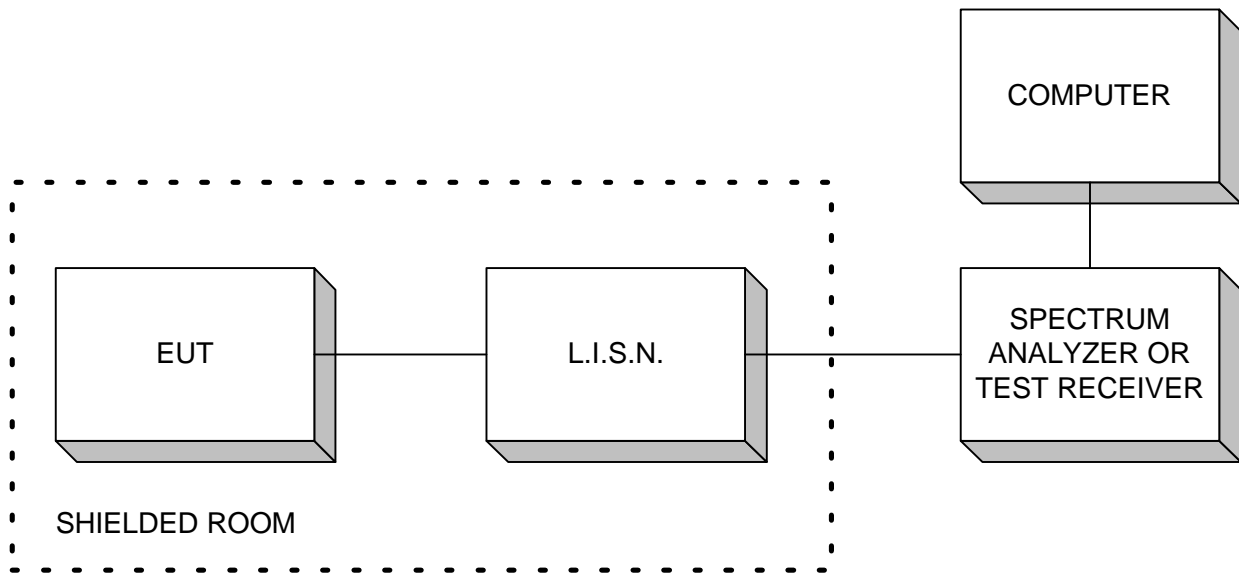
Emissions were measured at a distance of 3 meters and corrected for antenna factor and cable loss.

i.e. Received Signal = 25 dB μ V @ 100 MHz
 Antenna Factor & Cable Loss = 9.8 dB
 Field Intensity = 25 + 9.8 = 34.8 dB μ V/m @ 3 m

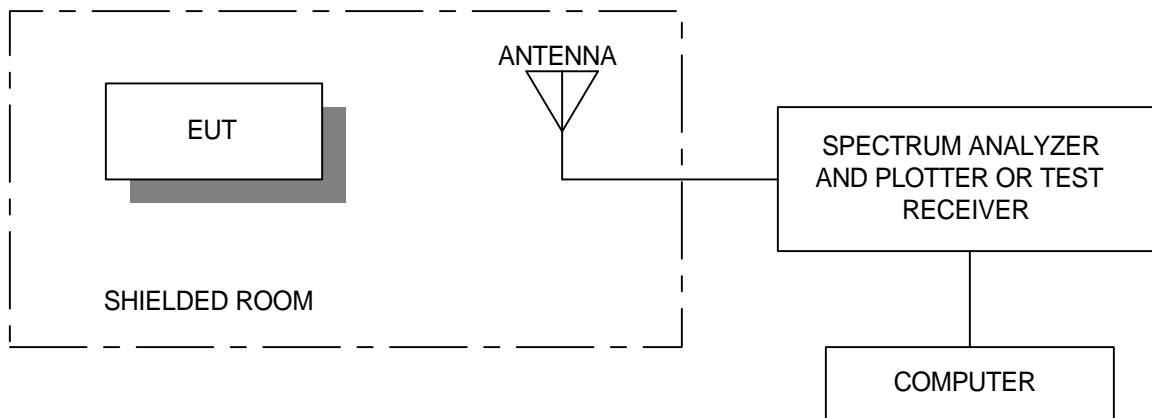
EQUIPMENT: 1759EX

Section 7. Block Diagrams

Conducted Emissions

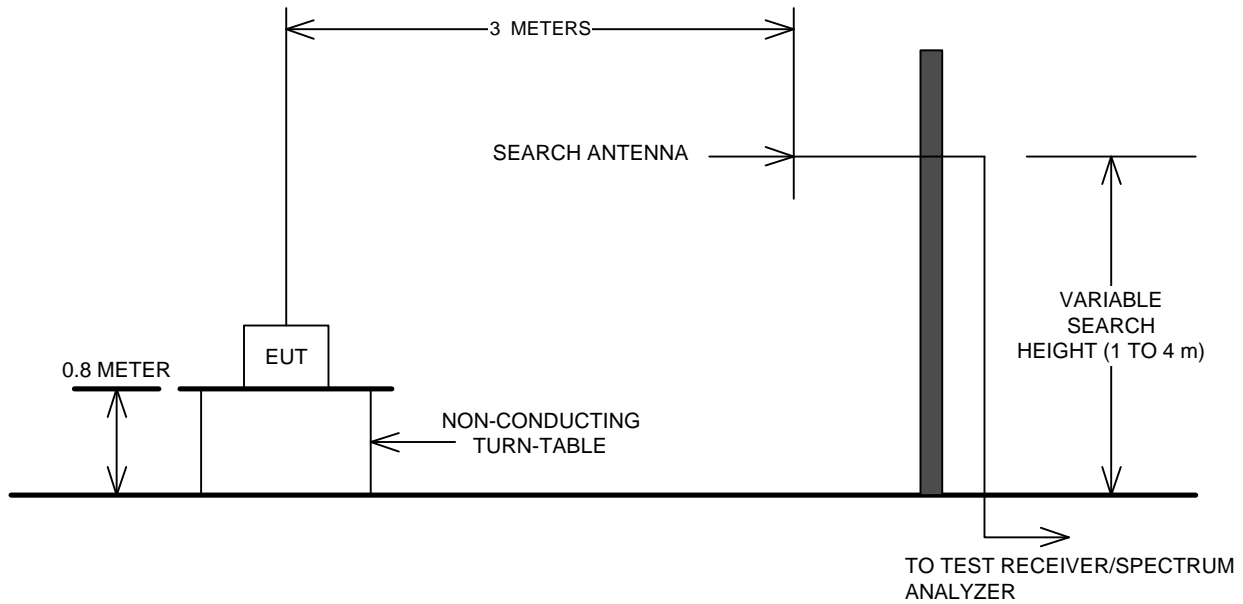


Radiated Prescan



EQUIPMENT: 1759EX

Outdoor Test Site For Radiated Emissions



The spectrum was searched up to 1GHz or the 5th harmonic of the highest oscillator frequency, which ever was higher, up to a maximum of 40GHz.

*EQUIPMENT: 1759EX***Section 8. Test Equipment List****TEST EQUIPMENT LIST NEMKO CANADA - OTTAWA****Equipment List – Conducted Emissions - Anechoic Chamber**

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	LISN	EMCO	4825/2	FA001545	Oct. 09/01	Oct. 09/02
1 Year	Receiver	Rohde & Schwarz	ESH3	FA000208	Mar. 07/02	Mar. 07/03
1 Year	Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	Nov. 27/01	Nov. 27/02
1 Year	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	Nov. 27/01	Nov. 27/02
1 Year	Quasi-Peak Adapter	Hewlett-Packard	85650A	FA000801	Nov. 27/01	Nov. 27/02
1 Year	Transient Limiter	Hewlett-Packard	1194 7A	FA000975	Oct. 19/01	Oct. 19/02

Equipment List – Prescan for Radiated Emissions - Anechoic Chamber

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	July. 15/02	July. 15/03
1 Year	Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	Nov. 27/01	Nov. 27/02
1 Year	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	Nov. 27/01	Nov. 27/02
1 Year	Quasi-Peak Adapter	Hewlett-Packard	85650A	FA000801	Nov. 27/01	Nov. 27/02
	Bilog	Schaffner	CBL6112B	FA001504	NCR	NCR
1 Year	Horn Antenna #2	EMCO	3115	FA000825	Dec. 01/01	Dec. 01/02
NCR	0.1 – 1300 MHz Amplifier	Hewlett Packard	8447D	FA001748	NCR	NCR
1 Year	1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June. 04/02	June. 04/03

Equipment List - Radiated Emissions

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Receiver	Rohde & Schwarz	ESVP	FA000951	May. 02/02	May. 02/03
1 Year	Spectrum Analyzer	Hewlett-Packard	8565E	FA000981	July. 15/02	July. 15/03
1 Year	Biconical (1) Antenna	EMCO	3109	FA000805	Aug. 22/01	Aug. 22/02
1 Year	Horn Antenna #2	EMCO	3115	FA000825	Dec. 01/01	Dec. 01/02
1 Year	Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 28/01	Aug. 28/02
1 Year	1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	June. 04/02	June. 04/03