



**Test Report:** 4R35202.1


**Applicant:** Digital Security Controls Ltd.  
3301 Langstaff Road  
Concord, ON  
Canada  
L4K 4L2

**Equipment Under Test:** Keypad with RF Receiver for Alarm System

**Model Number:** RF5501-433NA

**In Accordance With:** **FCC Part 15, Subpart B**

**Tested By:** Nemko Canada Inc.  
303 River Road, R.R. 5  
Ottawa, Ontario K1V 1H2



**Authorized By:** Glen Westwell, Wireless Specialist

**Date:** 23 December 2004

**Total Number of Pages:** 16

 Nemko Canada Inc., Ottawa, Ontario Canada	Reference Standard: FCC Part 15, Subpart B
	Test Report No: 4R35202.1
	Equipment (EUT): Keypad with RF Receiver for Alarm System

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## Measurement Uncertainty



Accuracy of Measurement		
Measurement uncertainty was calculated using the methods described in CISPR 16-4 <i>Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements</i> and Nemko Canada Inc. procedure EMC/MUC/001 <i>Uncertainty in EMC Measurements</i> .		
Test Specific Measurement Uncertainty		
Measurement	Test Specification	U <sub>lab</sub>
Conducted disturbance	9kHz – 150kHz	4.0dB
	150kHz – 30MHz	3.6dB
Radiated disturbance	30MHz – 200MHz Horizontal polarization	4.7dB
	200MHz – 1000MHz Horizontal polarization	4.7dB
	30MHz – 200MHz Vertical polarization	4.9dB
	200MHz – 1000MHz Vertical polarization	4.9dB

## Lab Environmental Conditions


Lab Conditions
Ambient Temperature: 15°C to 35°C, Relative Humidity: 30% to 60%, Atmospheric Pressure: 86kPa (860mbar) to 106kPa (1 060mbar)

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## Declaration

Product Name: Keypad with RF Receiver for Alarm System				
Model No: RF5501-433NA				
Trademark: 				
Serial No: None				
Name of Applicant: Digital Security Controls Ltd.				
Name of Manufacturer: Digital Security Controls Ltd.				
 Nemko Canada Inc., Ottawa, Ontario Canada	<b>TEST RESULT</b>			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;"><b>PASS</b></td> <td style="text-align: center; width: 50%;"><b>FAIL</b></td> </tr> <tr> <td style="text-align: center; vertical-align: middle;">X</td> <td></td> </tr> </table>	<b>PASS</b>	<b>FAIL</b>	X
<b>PASS</b>	<b>FAIL</b>			
X				
<b>In the configuration tested, the EUT complied with the requirements of:  FCC 47 CFR Part 15, Subpart B: Paragraph No. 15.107, Paragraph No. 15.109,  and Paragraph No. 15.111</b>				

*Note: See Summary of Test Results and Engineering Considerations for full details.*

Tested by: _____ Signature <u>David Duchesne, EMC Specialist</u>	<u>23 December 2004</u> Date	
Reviewed by: _____ Signature <u>Glen Westwell, EMC Specialist</u>	<u>23 December 2004</u> Date	
Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada. The tests included in this report are within the scope of this accreditation.		

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## Summary of Test Results

### General

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart B, 15109.

Radiated Emissions were measured on an open area test site. A description of the test facility is on file with the FCC.

These tests were conducted using measurement procedures of ANSI C63.4-2001.

The equipment was tested for conducted emissions from 0.15MHz to 30MHz using a 50 microhenry line impedance stabilization network (L.I.S.N.) as described in ANSI C63.4-2001. Peripheral equipment was also operated through a 50 microhenry L.I.S.N.

### Limits For Conducted Disturbance At The Mains Ports: Paragraph No. 15.107 for Class A

Frequency Range MHz	Limits dB(μV)		Result (Pass/Fail)
	Quasi-Peak	Average	
0.15 to 0.50	79	66	N/A
0.50 to 30	73	60	

### Limits For Conducted Disturbance At The Mains Ports: Paragraph No. 15.107 for Class B

Frequency Range MHz	Limits dB(μV)		Result (Pass/Fail)
	Quasi-Peak	Average	
0.15 to 0.50	66 to 56	56 to 46	Pass
0.5 to 5	56	46	
5 to 30	60	50	

### Notes

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz.

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Summary of Test Results, continued

Limits For Radiated Disturbance: Paragraph No. 15.109		
Frequency Range MHz	Limits For Radiated Disturbance At A Measuring Distance Of 10 Meters Class A	
	Quasi-Peak Limits dB ( $\mu$ V/m)	Result (Pass/Fail)
30 - 88	39.1	N/A
88 - 216	43.5	
216 - 960	46.4	
Above 960	49.5	
Frequency Range MHz	Limits For Radiated Disturbance At A Measuring Distance Of 3 Meters Class B	
	Quasi-Peak Limits dB ( $\mu$ V/m)	Result (Pass/Fail)
30 - 88	40.0	Pass
88 - 216	43.5	
216 - 960	46.0	
Above 960	54.0	
<b>Notes</b>		
1. The lower limit shall apply at the transition frequency. 2. Additional provisions may be required for cases where interference occurs. The spectrum was investigated from 30MHz up to the frequency shown in the following table based on the highest operating frequency used in the EUT  The highest operational frequency used in the EUT was 16MHz.		
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 <sup>th</sup> harmonic of the highest frequency or 40GHz, whichever is lower.	
<b>Antenna Conducted Emissions: Paragraph No. 15.111</b>		
<b>No external receiving antenna may be connected to the EUT. No testing required for Paragraph No. 15.111</b>		

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## Engineering Considerations

<b>Product Modification</b>	
To achieve compliance the following change(s) were made during compliance testing: None	
<b>Justification</b>	
None	
<b>Deviations</b>	
The following deviations from, additions to, or exclusions from the test specification have been made: None	
<b>Test Report Revision History</b>	
<b>Issue #</b>	<b>Details of changes made to test report</b>
-	Original Report Issued
N/A	N/A
N/A	N/A
N/A	N/A

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## General Information Regarding the Equipment Under Test (EUT)

Date Received In Laboratory:	December 8, 2004
Nemko Identification Number:	Refer to Nemko Canada receiving report.
<b>EUT Mains Input Voltage and Frequency</b>	
Voltage: 120VAC Frequency: 60Hz	
<b>Description &amp; Theory of Operation</b>	
Keypad connects to the DSC alarm control panel via a 4 wire keybus and displays system status messages. It receives the RF messages from enrolled short-range RF devices and communicates the information to the control panel via keybus.	
<b>EUT Clock and Operational Frequencies</b>	
16MHz, 13.225MHz, 433.92 (receiving), LO = 423.22MHz	
<b>Exercise/Monitoring method</b>	
The EUT was powered up and connected to a security panel.	
<b>Software Version</b>	
Ver. 5.02	
<b>Additional Information</b>	
The EUT is a superhetrodine receiver.	



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## Equipment Configuration

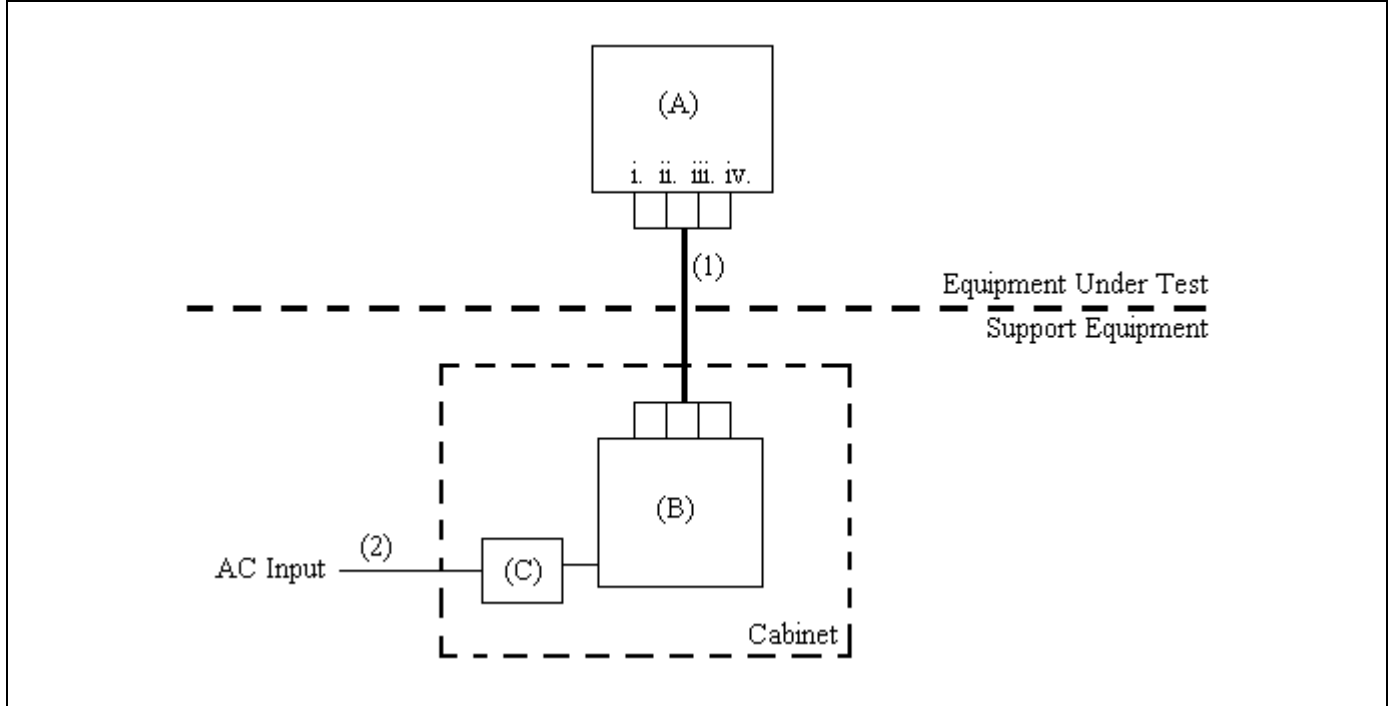
Equipment Configuration List		
Item	Description	Identification: (MN#, SN#, PN#, Rev.)
(A)	Keypad with RF receiver for alarm system	MN# RF5501-433NA
(B)	Alarm Panel	MN# DSC PC5020
(C)	ATC Frost Transformer	MN# FTC3718

EUT Ports				
Item	Description	Indoor/Outdoor	Type (See Legend)	Qty
i.	Red (+12Vdc)	Indoor	2	1
ii.	Black (GND)	Indoor	2	1
iii.	Green	Indoor	4	1
iv.	Yellow	Indoor	4	1
v.	P1, P2	Indoor	4	2

Inter-Connection Cables				
Item	Description	Shielded	Ferrite	Length (m)
(1)	22 – AWG 4 Conductor Twisted Pair	No	None	2.0
(2)	18 – AWG 2 Conductor Power Cable	No	None	1.5

Legend:  
1 = AC Power Input/Output, 2 = DC Power Input/Output, 3 = Telecom, 4 = Non-telecom I/O, 5 = Maintenance, 6 = Fiber Optic

### Configuration of the Equipment Under Test (EUT)



Notes  
None

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	<b>Equipment (EUT): Keypad with RF Receiver for Alarm System</b>

## Radiated Disturbance

Test Date: December 22, 2004											
Engineer's Name: David Duchesne											
Tested as per: Table Top											
Mains Input Voltage: 120VAC						Mains Input Frequency: 60Hz					
Enclosure Investigation Data											
Test Distance (meters): 3						Dome: 1					
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Amp.
48.0000	BC2	V	27.0	10.2	N/A	0.8	38.0	40.0	2.0	Q-Peak	N/A
64.0023	BC2	V	16.0	8.7	N/A	0.9	25.6	40.0	14.4	Q-Peak	N/A
80.0023	BC2	V	17.5	7.3	N/A	1.0	25.8	40.0	14.2	Q-Peak	N/A
112.0023	BC2	V	24.0	11.1	N/A	1.3	36.5	43.5	7.0	Q-Peak	N/A
128.0023	BC2	V	19.0	13.4	N/A	1.5	33.9	43.5	9.6	Q-Peak	N/A
224.0062	BC2	V	10.0	16.0	N/A	1.8	27.8	46.0	18.2	Q-Peak	N/A
Legend: Antenna Legend: BC = Biconical Detector Legend: Q-Peak = 120kHz											
Notes											
The EUT was tested in a position that was representative of wall mount installation.											
Deviations											
Refer to Engineering Considerations.											
Test Result											
<b>Final Test Result: Pass</b>											

Radiated Disturbance Test Equipment Used						
CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 26/04	July 26/05
1 Year	Biconical (2) Antenna	EMCO	3109	FA000904	Aug. 03/04	Aug. 03/05
Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use						



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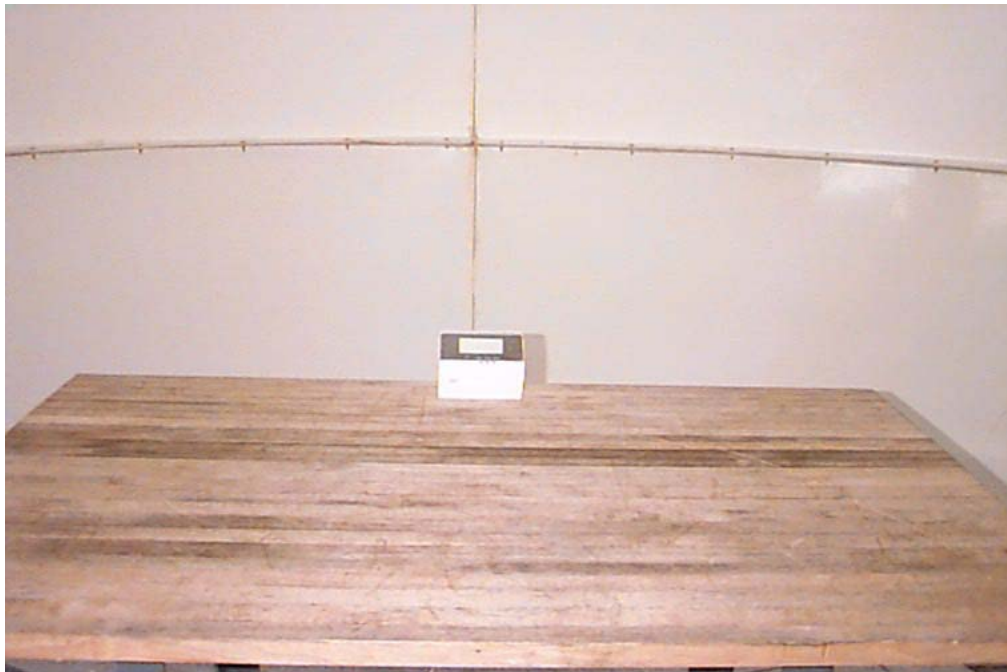
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Radiated Disturbance, continued

Radiated Disturbance Setup Photos



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## Conducted Disturbance at Mains Port

Test Date: December 22, 2004									
Engineer's Name: David Duchesne									
Tested as per: Table Top									
Mains Input Voltage: 120VAC					Mains Input Frequency: 60Hz				
Spectrum plots for each frequency band can be found at the back of this section. *All plots were generated with a peak detector.									
<b>Port Investigation Data</b>									
Port under test: AC mains input									
Results: Refer to plots of this section and tables.									
Conductor	Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	
Phase	0.1500	Quasi Peak	51.5	0.10	0.00	51.60	66.0	14.4	
		Average	2.4	0.10	0.00	2.50	56.0	53.5	
	0.1629	Quasi Peak	49.3	0.10	0.11	49.51	65.3	15.8	
		Average	12.2	0.10	0.11	12.41	55.3	42.9	
	0.2205	Quasi Peak	39.1	0.10	0.20	39.40	62.8	23.4	
		Average	8.8	0.10	0.20	9.10	52.8	43.7	
	0.4067	Quasi Peak	18.3	0.10	0.20	18.60	57.7	39.1	
		Average	1.0	0.10	0.20	1.30	47.7	46.4	
	0.4582	Quasi Peak	12.9	0.10	0.20	13.20	56.7	43.5	
		Average	1.0	0.10	0.20	1.30	46.7	45.4	
	0.4731	Quasi Peak	12.4	0.10	0.20	12.70	56.5	43.8	
		Average	2.4	0.10	0.20	2.70	46.5	43.8	
	Neutral	0.1500	Quasi Peak	51.9	0.10	0.00	52.00	66.0	14.0
			Average	3.2	0.10	0.00	3.30	56.0	52.7
0.1629		Quasi Peak	49.5	0.10	0.11	49.71	65.3	15.6	
		Average	12.6	0.10	0.11	12.81	55.3	42.5	
0.2205		Quasi Peak	39.1	0.10	0.20	39.40	62.8	23.4	
		Average	9.0	0.10	0.20	9.30	52.8	43.5	
0.4067		Quasi Peak	18.6	0.10	0.20	18.90	57.7	38.8	
		Average	1.0	0.10	0.20	1.30	47.7	46.4	
0.4582		Quasi Peak	14.0	0.07	0.20	14.27	56.7	42.5	
		Average	1.0	0.07	0.20	1.27	46.7	45.5	
0.4731		Quasi Peak	13.7	0.06	0.20	13.96	56.5	42.5	
		Average	1.8	0.06	0.20	2.06	46.5	44.4	
Notes									
None									

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Conducted Disturbance at Mains, continued

Deviations
Refer to Engineering Considerations.
Test Result
<b>Final Test Result: Pass</b>

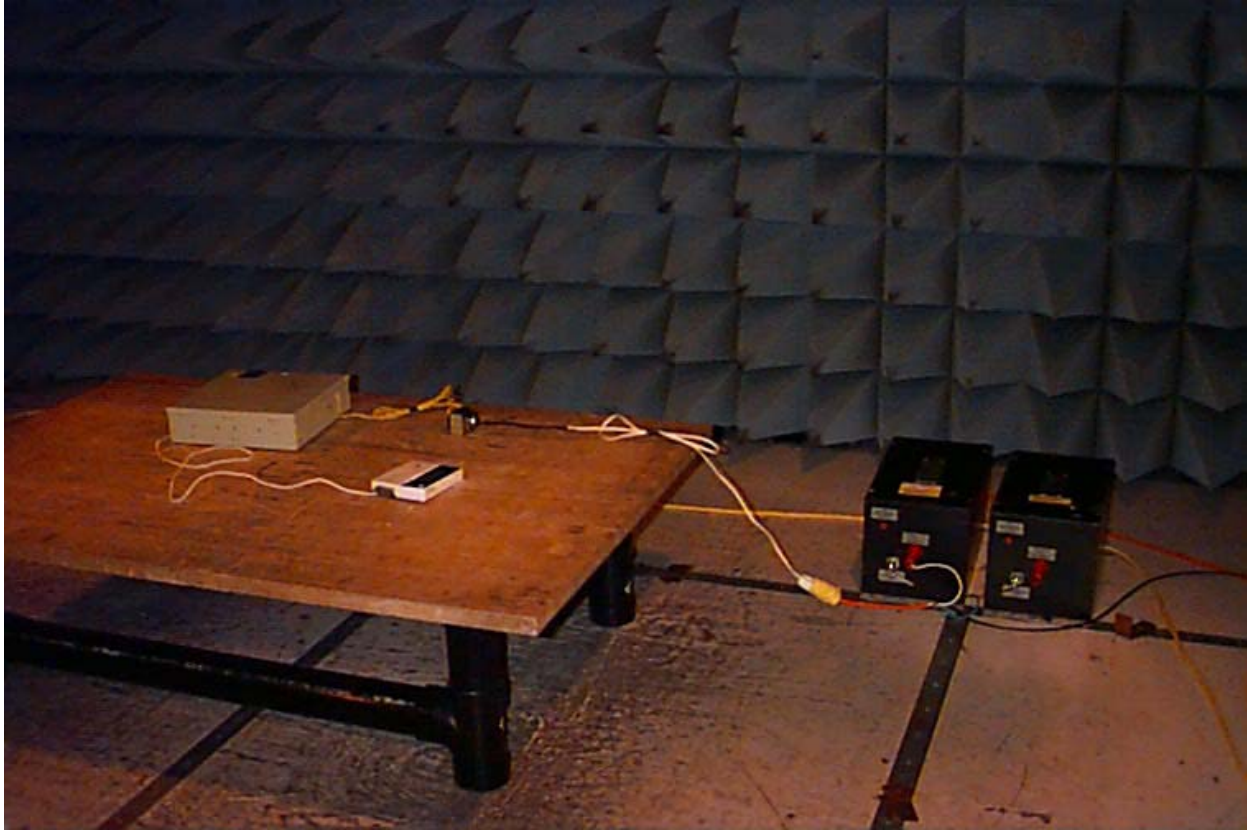
Conducted Disturbance at Mains Test Equipment Used						
CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
Extended	LISN	Tegam	95300-50	FA000736	Nov. 17/03	Feb. 17/05
Extended	LISN	Tegam	95300-50	FA000737	Nov. 17/03	Feb. 17/05
1 Year	Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 28/04	May 28/05
1 Year	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 28/04	May 28/05
1 Year	Transient Limiter	Hewlett-Packard	1194 7A	FA000975	June 10/04	June 10/05
1 Year	Receiver	Rohde & Schwarz	ESH3	FA000872	Jan. 14/04	Jan. 14/05

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

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Conducted Disturbance at Mains, continued

Conducted Disturbance at Mains Setup Photos





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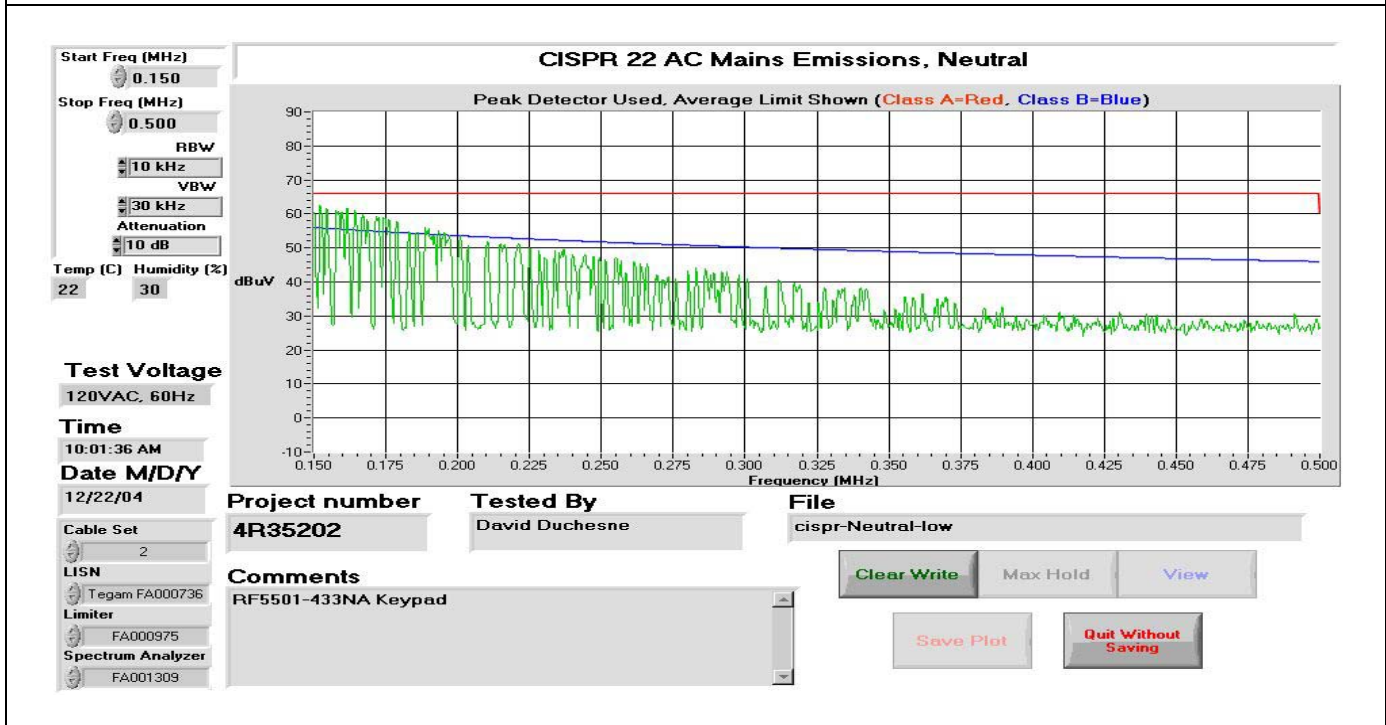
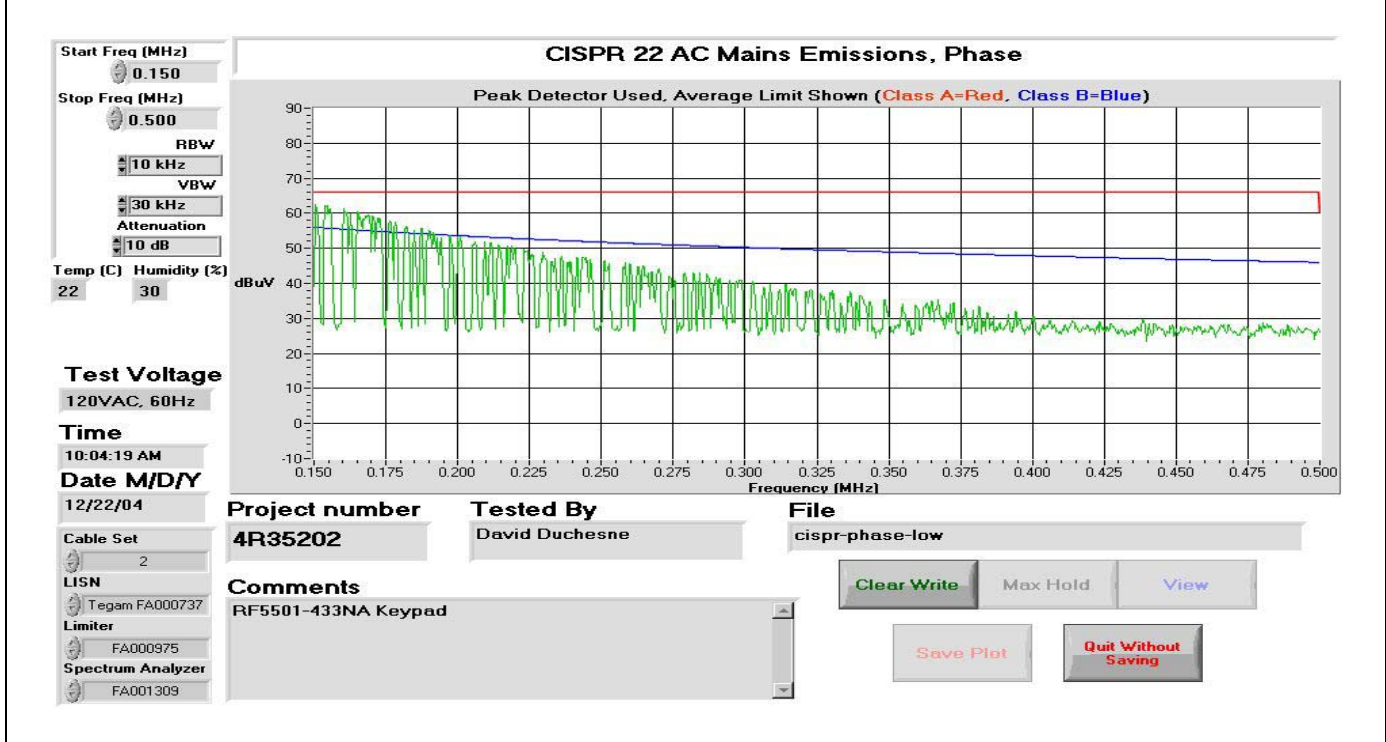
Reference Standard: FCC Part 15, Subpart B

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Conducted Disturbance at Mains, continued

Conducted Disturbance at Mains Plots





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Equipment (EUT): Keypad with RF Receiver for Alarm System

Conducted Disturbance at Mains, continued

Conducted Disturbance at Mains Plots, continued

