HERMON LABORATORIES

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839.01
Electrical

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Attachment to VISRAD_FCC.15006

EQUIPMENT UNDER TEST:

Dual Technology, Digital MW/PIR Intrusion Detector
Model: Next DUO

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1 Emissions test

1.1 Radio frequency interference voltage measurements according to paragraphs 15.107, 15.207

1.1.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 1.1.1. The worst test results (the lowest margins) were recorded in Table 1.1.2 and shown in the associated plots.

TEST SPECIFICATION: 47CFR part 15, subpart B, Class B

Table 1.1.1
Mains terminal radio interference voltage specification test limits

Frequency, MHz	Class B equipment, dB(μV)	
	QP	AVRG
0.15 - 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30	60	50

*The limit decreases linearly with the logarithm of frequency.

1.1.2 Test procedure

1.1.2.1 The EUT was configured as shown in Figure 1.1.1, set up as shown in Figure 1.1.2 and the associated photograph, energized and the performance check was conducted.

1.1.2.2 The measurements were performed at mains terminals by means of the LISN, connected to a spectrum analyzer in the frequency range referred to in Table 1.1.1. Unused coaxial connector of the LISN was terminated with 50 Ω. Quasi-peak detector was used during the testing as referred to in Table 1.1.2.

1.1.2.3 The EUT was found to be in compliance with the standard requirements and passed the test.

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Table 1.1.2
Radio frequency interference voltage test results

TEST SPECIFICATION:	47CFR part 15, subpart B, Class B
DATE:	December 23, 2002
RELATIVE HUMIDITY:	42%
AMBIENT TEMPERATURE:	23°C
AIR PRESSURE:	1017 hPa
THE EUT WAS TESTED AS:	TABLE-TOP
DETECTORS USED:	QUASI-PEAK
FREQUENCY RANGE:	150 kHz – 30 MHz
RESOLUTION BANDWIDTH:	9 kHz
MODE OF OPERATION	TRANSMITTING

Frequency, MHz	Line ID	Measured emissions, dB (mV)	Specification AVRG limit, dB (mV)	Margin, dB	Pass/ Fail
0.162430	N	29.39	55.39	26.00	**Pass**
0.162645	Ph	28.80	55.38	26.58	**Pass**
0.171190	Ph	29.03	54.97	25.94	**Pass**
0.175535	N	28.59	54.75	26.16	**Pass**
0.182425	Ph	26.19	54.42	28.23	**Pass**

All emissions measured with quasi-peak detector were found more than 25 dB below the average limit, therefore further measurements with average detector were considered unnecessary.

Table calculations and abbreviations:

- Line ID = line identification (Ph - phase, N - neutral).
- Margin = dB below (negative if above) specification limit.
- AVRG = average

Reference numbers of test equipment used

HL 0163	HL 0580	HL 0590	HL 1430		

Full description is given in Appendix A.

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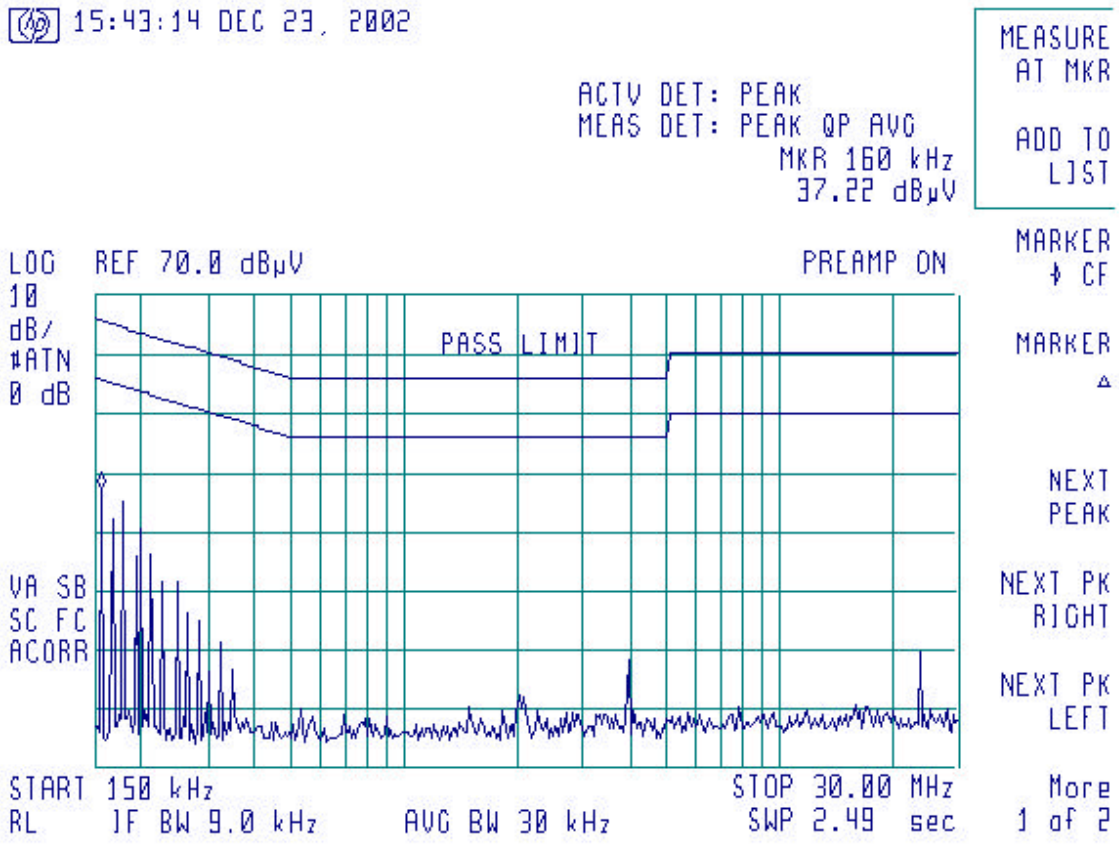
Plot 1.1.1
Mains terminal radio frequency interference voltage test results

LINE:	PHASE
LIMIT:	QUASI-PEAK, AVERAGE
DETECTOR:	PEAK



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Plot 1.1.2
Mains terminal radio frequency interference voltage test results

LINE:	NEUTRAL
LIMIT:	QUASI-PEAK, AVERAGE
DETECTOR:	PEAK

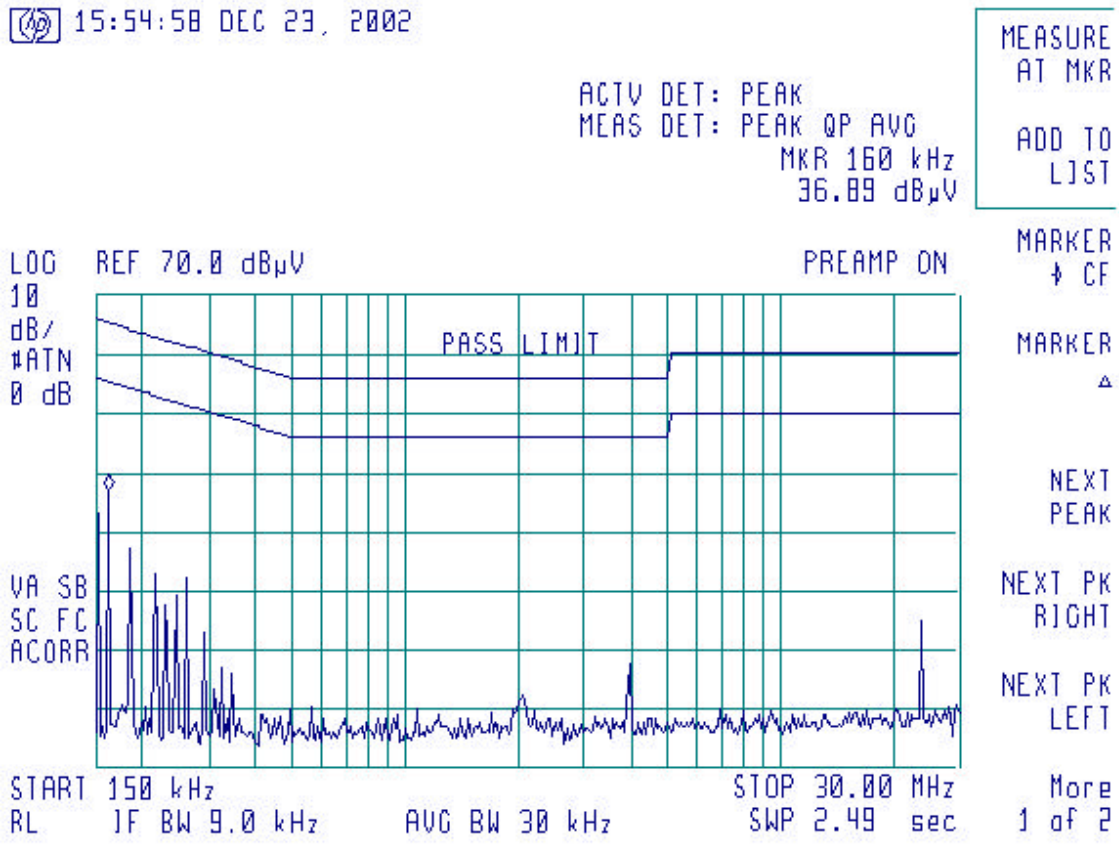

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Figure 1.1.1
EUT test configuration

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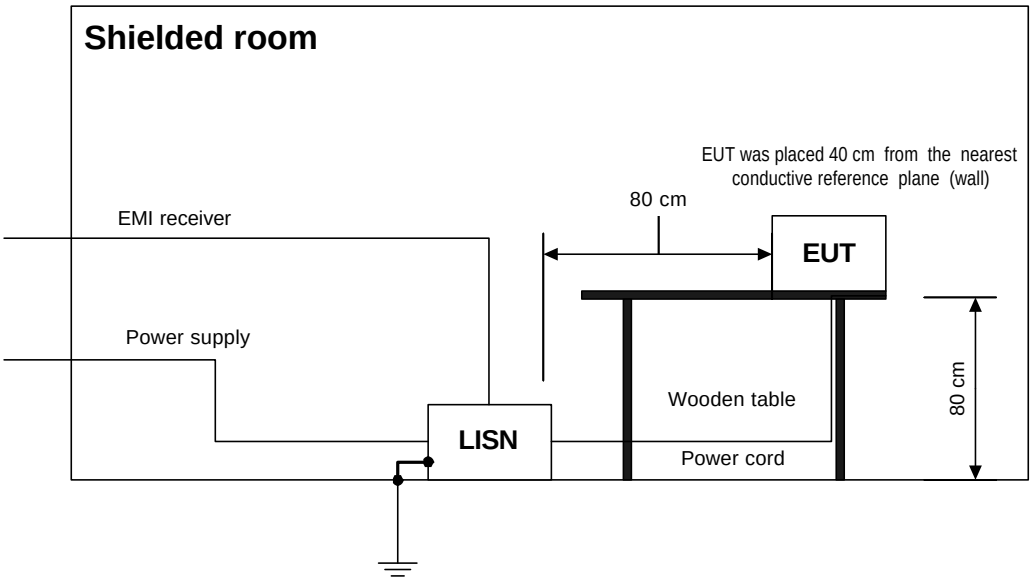
Figure 1.1.2
Setup for radio frequency interference voltage test, table-top equipment



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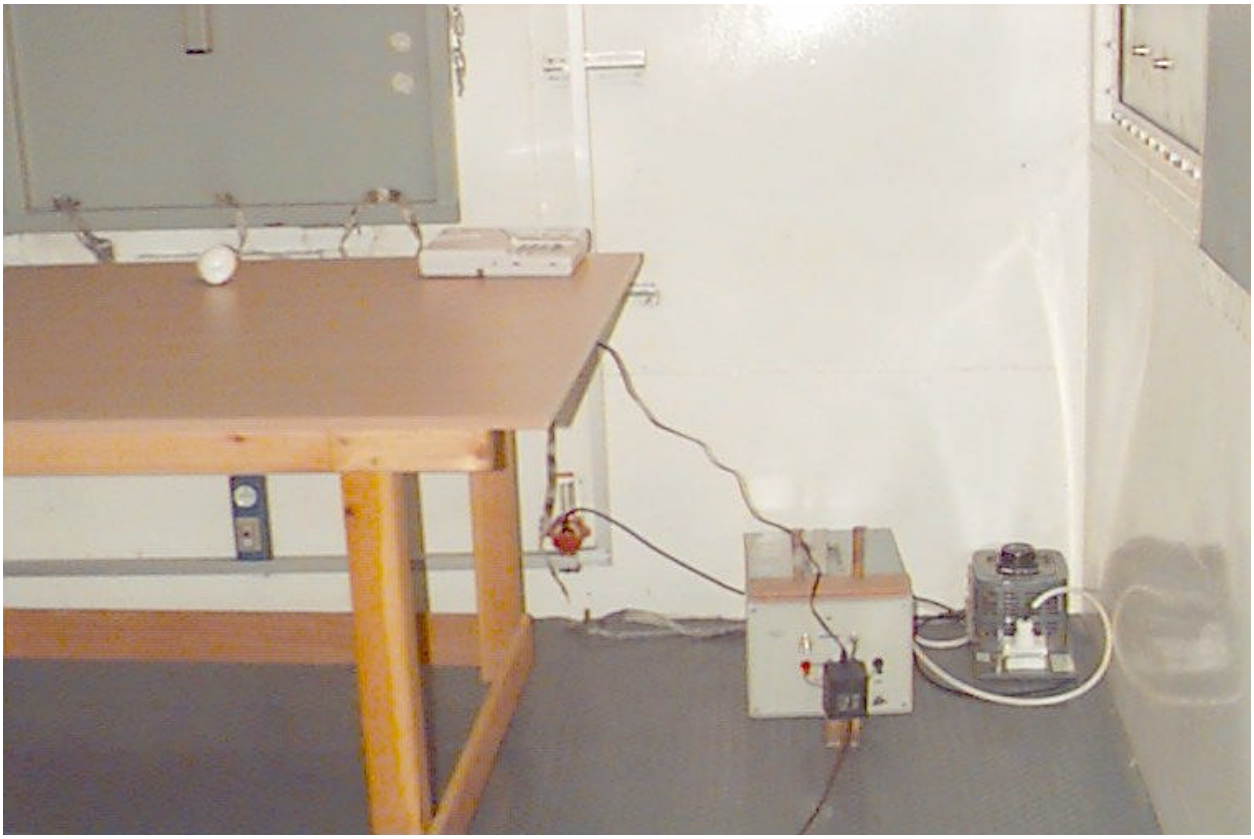
Photograph 1.1.1
Setup view for radio frequency interference voltage test



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APPENDIX A
Measurement uncertainty, test equipment and ancillaries used for tests

The test equipment has been calibrated according to its recommended procedures and is within the manufacturer's published limit of error. The standards and instruments used in the calibration system conform to the present requirements of ISO/IEC 17025 (or alternately ANSI/NCSL Z540-1).
The laboratory calibrates its standards by a third party (traceable to NIST, USA) on a regular basis according to equipment manufacturer requirements. The Hermon Labs EMC measurements uncertainty is given in the table below.

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
Conducted emissions with LISN and HP 8542E receiver	▪ 9 kHz to 150 kHz: +2.43 dB/-2.22 dB ▪ 150 kHz to 30 MHz: + 2.22 dB/-2.05 dB

Test equipment and ancillaries used for tests

HL Serial No.	Description	Manufacturer information			Due Calibr. Month/Year
		Name	Model No.	Serial No.	
0163	LISN FCC/VDE/MIL -STD	Electro-Metrics	ANS-25/2	1314	10/03
0580	DC block adaptor 10 kHz-2.2 GHz	Anritsu	MA8601 A	580	12/02
0590	Attenuator 10 dB, 50 Ohm, N-type, 2W	Elisra Electronic Systems	MW2100-N-Type	10	01/03
1430	EMI receiver, 9 kHz – 2.9 GHz	Hewlett Packard	8542E	3807A00262, 3705A00217	9/03

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APPENDIX B
Test equipment correction factors

Correction factor
Line impedance stabilization network
Model ANS-25/2
Electro-Metrics

Frequency, kHz	Correction Factor
10	4.9
15	2.86
20	1.83
25	1.25
30	0.91
35	0.69
40	0.53
50	0.35
60	0.25
70	0.18
80	0.14
90	0.11
100	0.09
125	0.06
150	0.04

The correction factor in dB is to be added to meter readings of an interference analyzer or a spectrum analyzer.