FCC CERTIFICATION TEST REPORT

for

Ness Security Products Pty, Ltd.

4/167 Prospect Highway
Seven Hills NSW 2147
Australia

FCC ID: O2K-SPIR304

October 18, 2000

WLL PROJECT #: 6034X

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TABLE OF CONTENTS

Statement of Qualifications

1.0 INTRODUCTION 1

1.1 SUMMARY 1

2.0 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) 1

2.1 ON-BOARD OSCILLATORS 1

3.0 TEST CONFIGURATION 1

3.1 TESTING ALGORITHM 2

3.2 CONDUCTED EMISSIONS TESTING 2

3.3 RADIATED EMISSIONS TESTING 2

3.3.1 Radiated Data Reduction and Reporting 3

Tables

Table 1. Radiated Emissions Results
Table 2. System Under Test
Table 3. Interface Cables Used
Table 4. Measurement Equipment Used

Exhibits

Exhibit 1 Duty Cycle Calculation
Exhibit 2 Bandwidth Plot

Appendices

Appendix A. Statement of Measurement Uncertainty

STATEMENT OF QUALIFICATIONS

for

Chad M. Beattie

Washington Laboratories, Ltd.

I am a NARTE-Accredited EMC Test Laboratory Engineer with an Associates in Electronic Systems Technology. I have nine years of electronics experience, the last five years being directly involved in EMI testing. I am qualified to perform EMC testing to the methods described in this test report. The measurements taken within this report are accurate within my ability to perform the tests and within the tolerance of the measuring instrumentation.

By: _____
Chad M. Beattie
Compliance Engineer

Date: October 18, 2000

FCC CERTIFICATION TEST REPORT

for

FCC ID: O2K-SPIR304

1.0 Introduction

This report has been prepared on behalf of Ness Security Products Pty, Ltd. to support the attached Application for Equipment Authorization. The test and application are submitted for an Intentional Radiator under Part 15.231 of the FCC Rules and Regulations. The Equipment Under Test was the Supervised Radio PIR Detector.

All measurements herein were performed according to the 1992 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and field Strength Instrumentation. Calibration checks are made periodically to verify proper performance of the measuring instrumentation.

All measurements are performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

All results reported herein relate only to the equipment tested. The measurement uncertainty of the data contained herein is ±2.3 dB. Refer to Appendix A for Statement of Measurement Uncertainty. This report shall not be used to claim product endorsement by NVLAP or any agency of the US Government.

1.1 Summary

The Ness Security Products Pty, Ltd. Supervised Radio PIR Detector complies with the limits for an Intentional Radiator under Part 15.231 of the FCC Rules and Regulations.

2.0 Description of Equipment Under Test (EUT)

The Ness Security Products Pty, Ltd. Supervised Radio PIR Detector (EUT) is a battery-powered alarm detector that uses a passive infrared sensor to detect the presence of an intruder. When the detector is triggered, it transmits an alarm message via a radio link to an alarm panel. It also transmits a supervisory message, if selected. The EUT operates at 303.8MHz using OOK modulation.

2.1 On-board Oscillators

The Ness Security Products Pty, Ltd. Supervised Radio PIR Detector contains the following oscillators: 1MHz

3.0 Test Configuration

To complete the test configuration required by the FCC, the transmitter was tested in all three orthogonal planes. All testing was performed using a fully charged 9Vdc battery.

3.1 Testing Algorithm

The transmitter was turned on and constantly transmitting. The system was tested in all three orthogonal planes.

Worst case emissions are recorded in the data tables.

3.2 Conducted Emissions Testing

The Supervised Radio PIR Detector is operated by a 9VDC battery, therefore, no conducted emission tests were performed.

3.3 Radiated Emissions Testing

The EUT was placed on an 80 cm high 1 x 1.5 meters non-conductive motorized turntable for radiated testing on a 3 meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Biconical and log periodic broadband antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The peripherals were placed on the table in accordance with ANSI C63.4-1992. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The output from the antenna was connected, via a preamplifier, to the input of the spectrum analyzer. The detector function was set to quasi-peak or peak, as appropriate. The measurement bandwidth on the spectrum analyzer system was set to at least 120 kHz, with all post-detector filtering no less than 10 times the measurement bandwidth. For emissions above 1GHz, the measurement bandwidth was set to 1MHz.

3.3.1 Radiated Data Reduction and Reporting

To convert the raw spectrum analyzer radiated data into a form that can be compared with the FCC limits, it is necessary to account for various calibration factors that are supplied with the antennas and other measurement accessories. These factors are grouped into a composite antenna factor (AFc) and are supplied in the AFc column of Table 1. The AFc in dB/m and AFd (duty cycle factor) in dBµV (see Exhibit 1) are algebraically added to the Spectrum Analyzer Voltage in dBµV to obtain the Radiated Electric Field in dBµV/m. This level is then compared with the limit.

Example:

Spectrum Analyzer Voltage:	VdBµV
Composite Antenna Factor:	AFcdB/m
Duty Cycle Factor:	AFddBµV
Electric Field:	EdBµV/m = VdBµV + AFcdB/m + AFddBµV
To convert to linear units:	Eµ V/m = antilog (EdBµV/m/20)

Data is recorded in Table 1.

Table 1: FCC 15.231 3M Radiated Emissions Data, Site 2

CLIENT: Ness Security Products
MODEL NO: Infrared Intruder Detector
TYPE/PART: 15.231
DATE: 25 Aug 00
BY: Chad M. Beattie
JOB #: 6034X

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak) dBuV	AFc dB/m	Afd Duty Cycle dB	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB
303.81	V	90.00	2.0	55.8	16.2	-10.2	61.8	1224.8	5573.1	-13.2
303.81	H	0.00	1.0	60.6	16.2	-10.2	66.6	2128.4	5573.1	-8.4
911.44	V	90.00	1.0	6.4	28.3	-10.2	24.5	16.7	557.3	-30.5
911.44	H	180.00	1.0	6.6	28.3	-10.2	24.7	17.1	557.3	-30.3

Average Measurements Above 1 GHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak) dBuV	AFc dB/m	Afd Duty Cycle dB	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB
1215.23	V	180.00	1.0	56.2	-10.9	-10.2	35.1	56.6	500.0	-18.9
1215.23	H	180.00	1.0	61.6	-10.9	-10.2	40.5	105.5	500.0	-13.5
1519.04	H	225.00	1.0	53.2	-8.8	-10.2	34.2	51.3	500.0	-19.8
1519.04	V	180.00	1.0	53.8	-8.8	-10.2	34.8	54.9	500.0	-19.2
1822.86	H	225.00	1.0	57.4	-7.1	-10.2	40.1	101.6	557.3	-14.8
1822.86	V	270.00	1.0	58.1	-7.1	-10.2	40.8	110.1	557.3	-14.1
2126.66	V	180.00	1.0	52.5	-5.9	-10.2	36.4	66.1	557.3	-18.5
2126.66	H	45.00	1.0	53.4	-5.9	-10.2	37.3	73.3	557.3	-17.6
2430.48	H	225.00	1.0	59.2	-5.3	-10.2	43.7	152.3	557.3	-11.3
2430.48	V	180.00	1.0	59.2	-5.3	-10.2	43.7	152.3	557.3	-11.3
2734.27	H	0.00	1.0	57.6	-4.9	-10.2	42.5	134.0	500.0	-11.4
2734.27	V	180.00	1.0	57.9	-4.9	-10.2	42.8	138.7	500.0	-11.1

Table 1 (Cont'd.): FCC 15.231 3M Radiated Emissions Data, Site 2

CLIENT: Ness Security Products
MODEL NO: Infrared Intruder Detector
TYPE/PART: 15.231
DATE: 25 Aug 00
BY: Chad M. Beattie
JOB #: 6034X

Peak Measurements Above 1GHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak) dBuV	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB
1215.23	H	225.00	1.0	56.2	-10.9	45.3	183.3	5000.0	-28.7
1215.23	V	180.00	1.0	61.6	-10.9	50.7	341.3	5000.0	-23.3
1519.04	H	45.00	1.0	53.2	-8.8	44.4	165.9	5000.0	-29.6
1519.04	V	180.00	1.0	53.8	-8.8	45.0	177.7	5000.0	-29.0
1822.86	H	225.00	1.0	57.4	-7.1	50.3	328.7	5573.0	-24.6
1822.86	V	270.00	1.0	58.1	-7.1	51.0	356.3	5573.0	-23.9
2126.66	H	0.00	1.0	52.5	-5.9	46.6	213.9	5573.0	-28.3
2126.66	H	45.00	1.0	53.4	-5.9	47.5	237.2	5573.0	-27.4
2430.48	V	180.00	1.0	59.2	-5.3	53.9	492.8	5573.0	-21.1
2430.48	H	225.00	1.0	59.2	-5.3	53.9	492.8	5573.0	-21.1
2734.27	H	90.00	1.0	57.6	-4.9	52.7	433.5	5000.0	-21.2
2734.27	V	180.00	1.0	57.9	-4.9	42.8	138.7	5000.0	-31.1

EXHIBIT 1

DUTY CYCLE CALCULATIONS

The following 2 pages show spectrum analyzer plots of the transmitter coding. The following calculations show the worst case 100 ms duty cycle correction used for calculating the average level of the carrier, harmonics, and emissions.

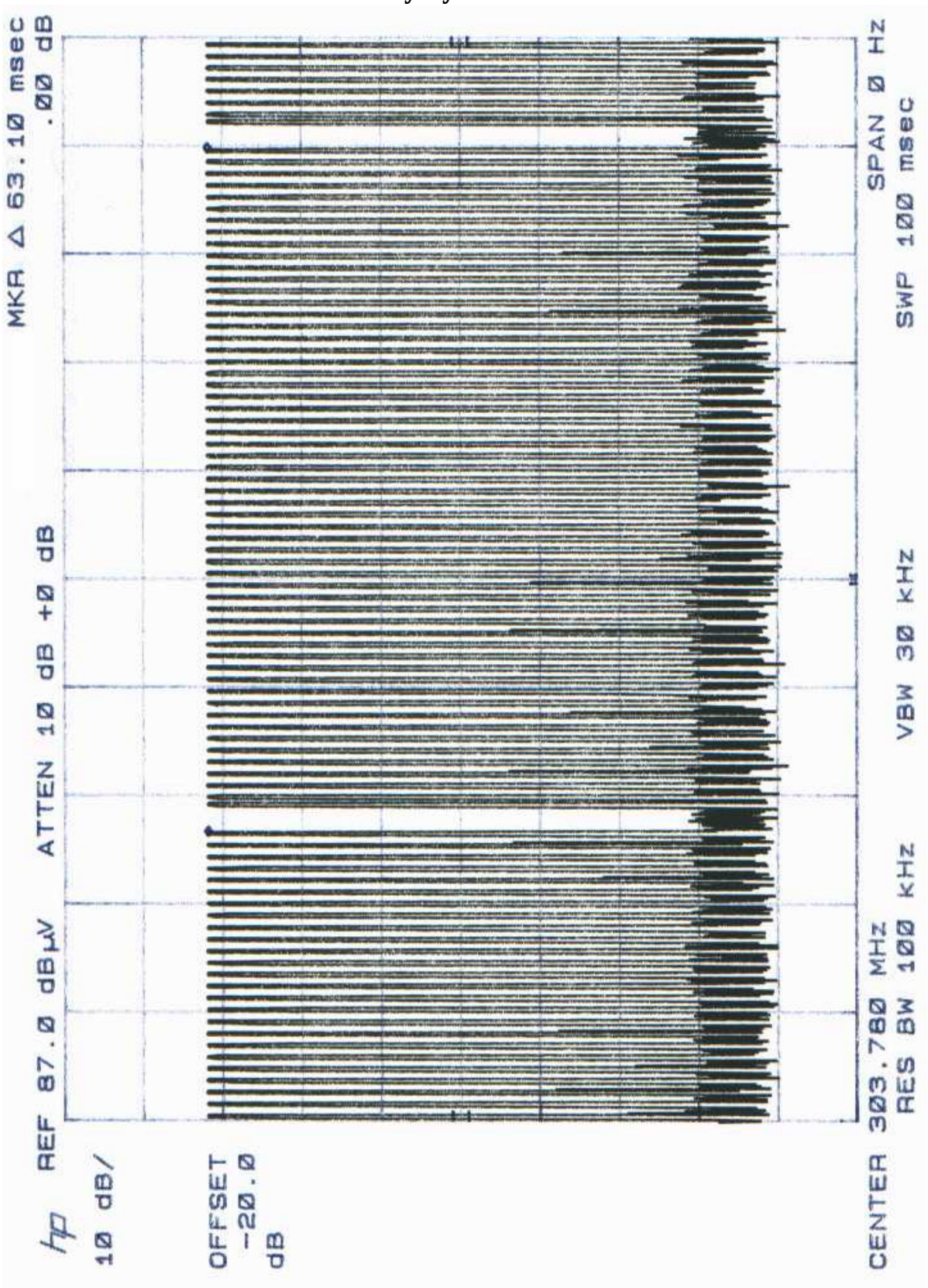
From the plots it is shown that each code group lasts for 63.1 ms and that each pulse within the code group is 340us wide. From this, the following Duty Cycle Correction Factor (AFd) is calculated.

ON TIME PER CODE GROUP:

(57 x 340 usec) = 19.38 ms ON TIME PER CODE GROUP (63.1 ms)

= 30.7% DUTY CYCLE
= -10.3 dB

Duty Cycle Plot #1



Duty Cycle Plot #2

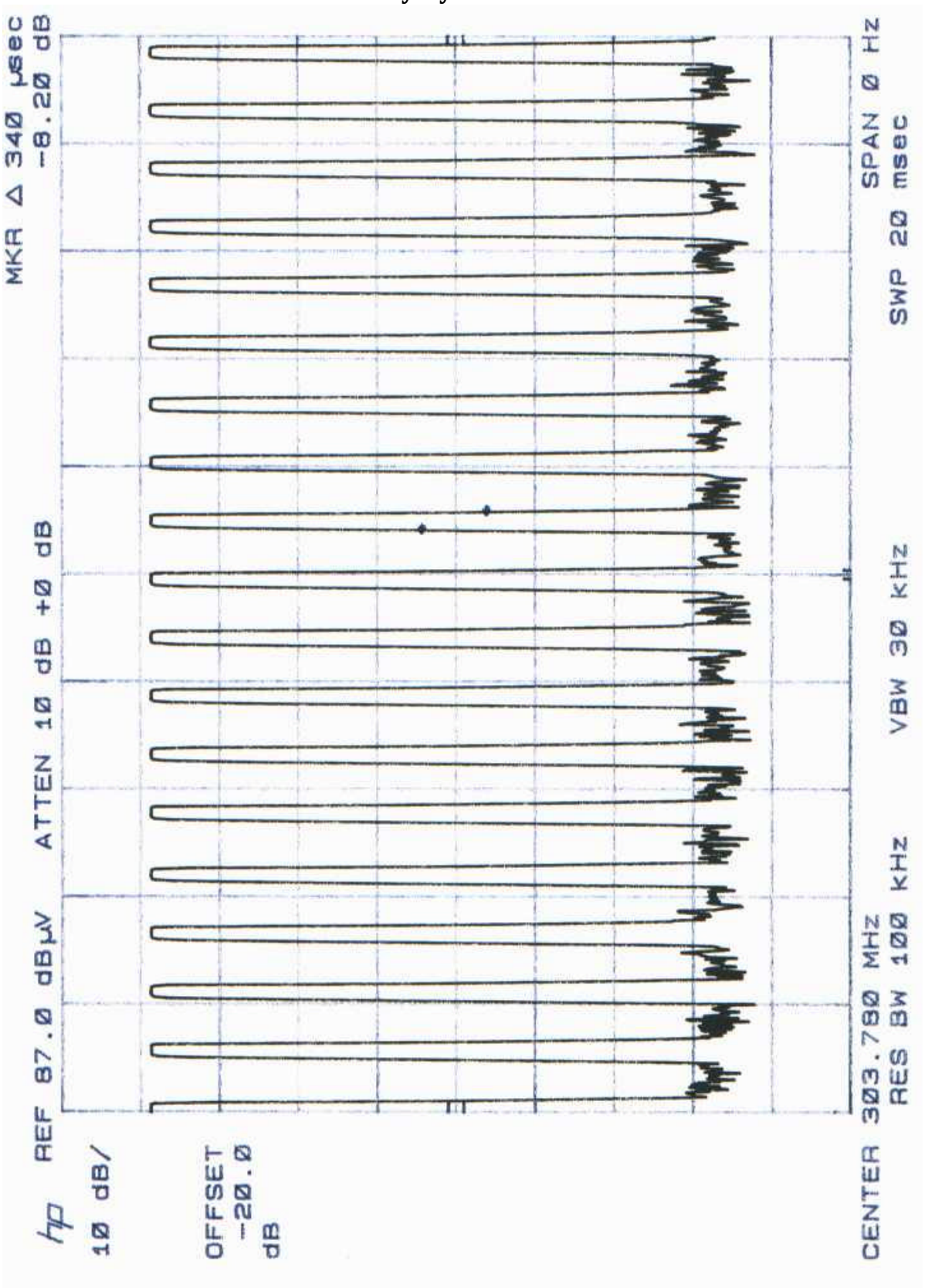


EXHIBIT 2

CARRIER BANDWIDTH DATA

The 20 dB modulated bandwidth shall be no wider than 0.25% of the center frequency.

Bandwidth Limit = Carrier Frequency x .0025

Bandwidth Limit = 303.8 MHz x .0025 = 759.5 kHz

Measured EUT Bandwidth = 308 kHz

Bandwidth Plot

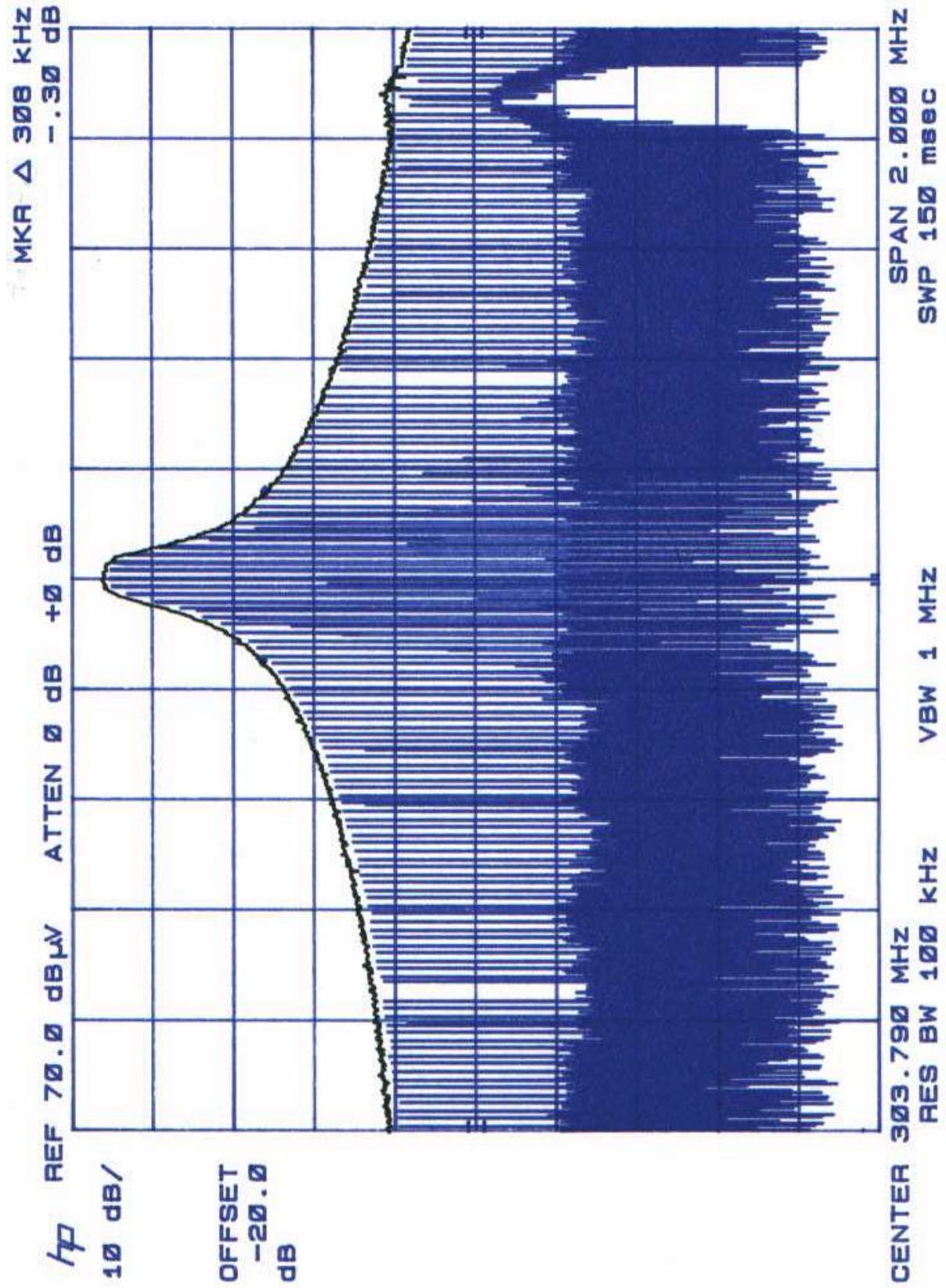


Table 2: System Under Test

FCC ID: O2K- SPIR304

EUT: Ness Security Products Pty, Ltd. Supervised Radio PIR Detector

Table 3: Interface Cables Used

The Ness Security Products Pty, Ltd. Supervised Radio PIR Detector is a stand-alone battery-operated unit. There are no external cables or I/O ports.

Table 4: Measurement Equipment Used

The following equipment is used to perform measurements:

Hewlett-Packard Spectrum Analyzer: HP8564E
Hewlett-Packard Spectrum Analyzer: HP8568B
Hewlett-Packard Spectrum Analyzer: HP8593A
Hewlett-Packard Quasi-Peak Adapter: HP85650A
Hewlett-Packard Preselector: HP85685A
Hewlett-Packard Preamplifier: HP8449B
Antenna Research Associates, Inc. Biconical Log Periodic Antenna: LPB-2520A (Site 2)
Antenna Research Associates, Inc. Horn Antenna: DRG-118/A
Solar 50 Ω/50 µH Line Impedance Stabilization Network: 8012-50-R-24-BNC
Solar 50 Ω/50 µH Line Impedance Stabilization Network: 8028-50-TS-24-BNC
AH Systems, Inc. Portable Antenna Mast: AMS-4 (Site 2)
AH Systems, Inc. Motorized Turntable (Site 2)
RG-214 semi-rigid coaxial cable
RG-223 double-shielded coaxial cable

Appendix A

Statement of Measurement Uncertainty

For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ±2.3 dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:

A = Antenna calibration uncertainty, in dB = 2 dB

B = Spectrum Analyzer uncertainty, in dB = 1 dB

C = Site uncertainty, in dB = 4 dB

n = number of factors in uncertainty calculation = 3

Thus, Total Uncertainty = $0.5\ (2^2 + 1^2 + 4^2)^{1/2}$ = ±2.3 dB.