FCC CERTIFICATION TEST REPORT

for

Ness Security Products PTY LTD
4/167 Prospect Highway 1
Seven Hills NSW 2147
Australia

FCC ID: O2K-SG3-304

May 24, 2000

WLL PROJECT #: 5678X

STATEMENT OF QUALIFICATIONS

TABLES

APPENDICES

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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: May 23, 2000

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FCC ID: O2K-SG3-304

1.0 Introduction

This report has been prepared on behalf of Ness Security Products to support the attached Application for Equipment Authorization. The test and application are submitted for a Periodic Intentional Radiator under Part 15.231 of the FCC Rules and Regulations. The Equipment Under Test was the NESS Security Products Securityguard III.

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 Securityguard III complies with the limits for a Periodic Intentional Radiator under Part 15.231 of the FCC Rules and Regulations.

2.0 Description of Equipment Under Test (EUT)

The Ness Security Products SecurityGuard III (EUT) is part of a home security alarm system utilizing Passive Infrared Detector circuitry. The EUT is a self-contained, wall-mounted remote alarm system incorporating a low-power transmitter operating at 303.898 MHz, and receiver. The unit is powered by an approved plug-pack linear transformer and, in addition, has a 3 AH sealed lead-acid rechargeable battery.

2.1 On-board Oscillators

The Ness Security Products SecurityGuard III contains the following oscillators: 303.9 MHz SAW Oscillator, 10MHz (Microprocessor Oscillator).

3.0 Test Configuration

To complete the test configuration required by the FCC, the transmitter was tested in the upright position as installed in normal installation. All testing was performed at 115VAC.

I/O Ports	I/O Cables
DC Power Inlet Port	Non-shielded, >1m, from AC Adapter to EUT
(J3) I/O Cable Bundle	Non-shielded, >1m, from EUT to Tamper Switch, External Siren, and Strobe

3.1 Testing Algorithm

The transmitter was modified for testing purposes only, to transmit continuously. The system was tested in the standard mounting configuration.

Worst case emissions are recorded in the data tables.

3.2 Conducted Emissions Testing

The EUT was placed on an 80 cm high 1 x 1.5 m non-conductive table above a ground plane. Power to the EUT was provided through a Solar Corporation 50 Ω/50 μH Line Impedance Stabilization Network bonded to a 3 x 2 meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 450 kHz to 30 MHz were measured. The detector function was set to quasi-peak or peak, as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth.

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 peak. For emissions below 1 GHz, 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 1 GHz, the measurement bandwidth on the spectrum analyzer system was set to at least 1 MHz, with all post-detector filtering no less than 10 times the measurement bandwidth.

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 2. The AFc in dB/m is 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 FCC limit.

Example:

Spectrum Analyzer Voltage: VdBμV

Composite Antenna Factor: AFcdB/m

Electric Field: EdBμV/m = VdBμV + AFcdB/m

To convert to linear units: EμV/m = antilog (EdBμV/m/20)

Data is recorded in Table 2.

Table 1: FCC Class B Conducted Emissions Data

CLIENT: Ness Security Products
MODEL NO: SecurityGuard III
DATE: 27 Jan 00
CLK SPEED(S): 303.898MHz TX
BY: Chad M. Beattie
JOB #: 5678x
CONFIGURATION: EUT constantly transmitting
Linear AC Power Supply

LINE 1 – NEUTRAL

Frequency MHz	Voltage (Peak) dBuV	Voltage uV	FCC Limit uV	Margin dB
0.45	27.2	22.9	250	-20.8
0.86	32.1	40.3	250	-15.9
2.70	29.7	30.5	250	-18.3
7.04	30.4	33.1	250	-17.6
11.97	30.8	34.7	250	-17.2
20.72	29.8	30.9	250	-18.2

LINE 2 - PHASE

Frequency MHz	Voltage (Peak) dBuV	Voltage uV	FCC Limit uV	Margin dB
0.45	25.9	19.7	250	-22.1
1.28	28.7	27.2	250	-19.3
3.35	29.9	31.3	250	-18.1
8.78	30.3	32.7	250	-17.7
15.88	30.3	32.7	250	-17.7
23.14	30.0	31.6	250	-18.0

Table 2: FCC 15.231 3M Radiated Emissions Data

CLIENT: Ness Security Products
MODEL NO: SecurityGuard III
DATE: 27 Jan 00
CLK SPEED(S): 303.898MHz TX
BY: Chad M. Beattie
JOB #: 5678x

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak) dBuV	Duty Cycle Correction (dB)	AFc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB
303.90	V	270.00	1.0	46.4	0.0	16.2	62.6	1343.3	5579.2	-12.4
303.90	H	0.00	1.5	49.3	0.0	16.2	65.5	1875.8	5579.2	-9.5
911.69	V	270.00	1.0	0.6	0.0	28.3	28.9	27.7	557.9	-26.1
911.69	H	0.00	1.0	1.6	0.0	28.3	29.9	31.1	557.9	-25.1
1215.55	V	315.00	1.0	44.0	-8.5	-10.9	24.6	16.9	500.0	-29.4
1519.45	V	225.00	1.0	43.9	-8.5	-8.8	26.6	21.4	500.0	-27.4
1519.45	H	0.00	1.0	46.8	-8.5	-8.8	29.5	29.8	500.0	-24.5
1823.34	V	225.00	1.0	47.2	-8.5	-7.1	31.6	38.1	557.9	-23.3
2431.12	V	0.00	1.0	61.2	-8.5	-5.3	47.3	232.4	557.9	-7.6
2431.12	H	180.00	1.0	58.3	-8.5	-5.3	44.5	167.0	557.9	-10.5
2735.01	V	0.00	1.0	42.3	-8.5	-4.9	29.0	28.1	500.0	-25.0
2735.01	H	315.00	1.0	43.5	-8.5	-4.9	30.1	32.1	500.0	-23.8
3039.06	V	0.00	1.0	42.4	-8.5	-4.4	29.5	29.9	557.9	-25.4
3039.06	H	0.00	1.0	43.7	-8.5	-4.4	30.8	34.6	557.9	-24.2

Ambient readings at 911.69 MHz and 3039.06 MHz.

Table 3: System Under Test

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EUT:	Ness Security Products SecurityGuard III FCC ID: O2K-SG3-304

Table 4: Interface Cables Used

Non-shielded I/O cables were used throughout the system under test.

The EUT was powered via a non-shielded AC power cord.

Table 5: 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
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
AH Systems, Inc. Motorized Turntable
RG-214 semi-rigid coaxial cable
RG-223 double-shielded coaxial cable

EXHIBIT 1

DUTY CYCLE CALCULATIONS

The following page shows a spectrum analyzer plot 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.

ON TIME PER 100 ms/Code group:

(90 x 420 us) = 37.8 ms ON TIME PER 100 ms

= 37.8% DUTY CYCLE
= -8.45 dB

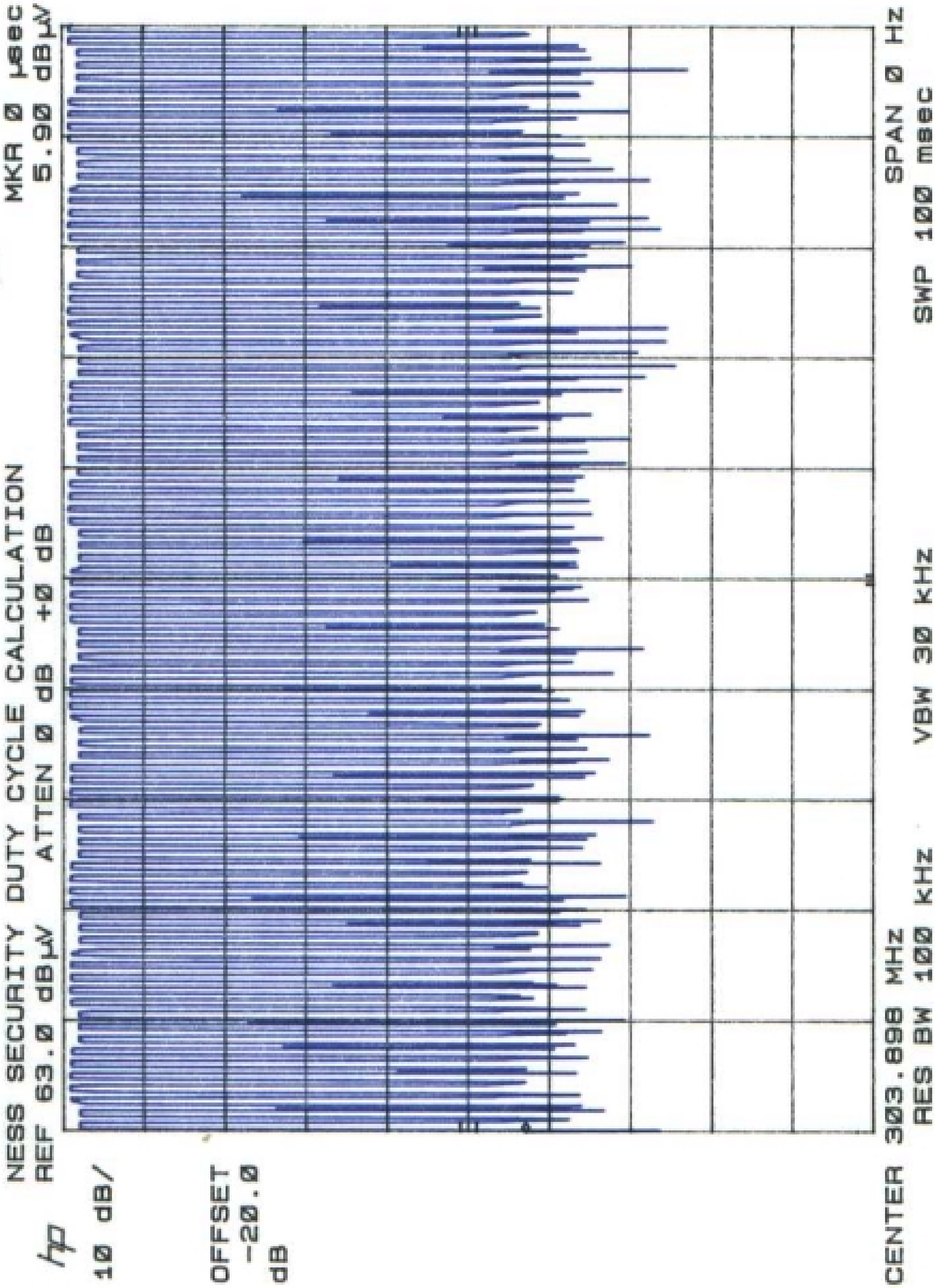

NESS SECURITY DUTY CYCLE CALCULATION
MKR 0 µsec
5.90 dBµV
REF 63.0 dBµV ATTEN 0 dB +0 dB
10 dB/
OFFSET
-20.0
dB
CENTER 303.898 MHz
SPAN 0 Hz
RES BW 100 kHz
VBW 30 kHz
SWP 100 msec

EXHIBIT 2

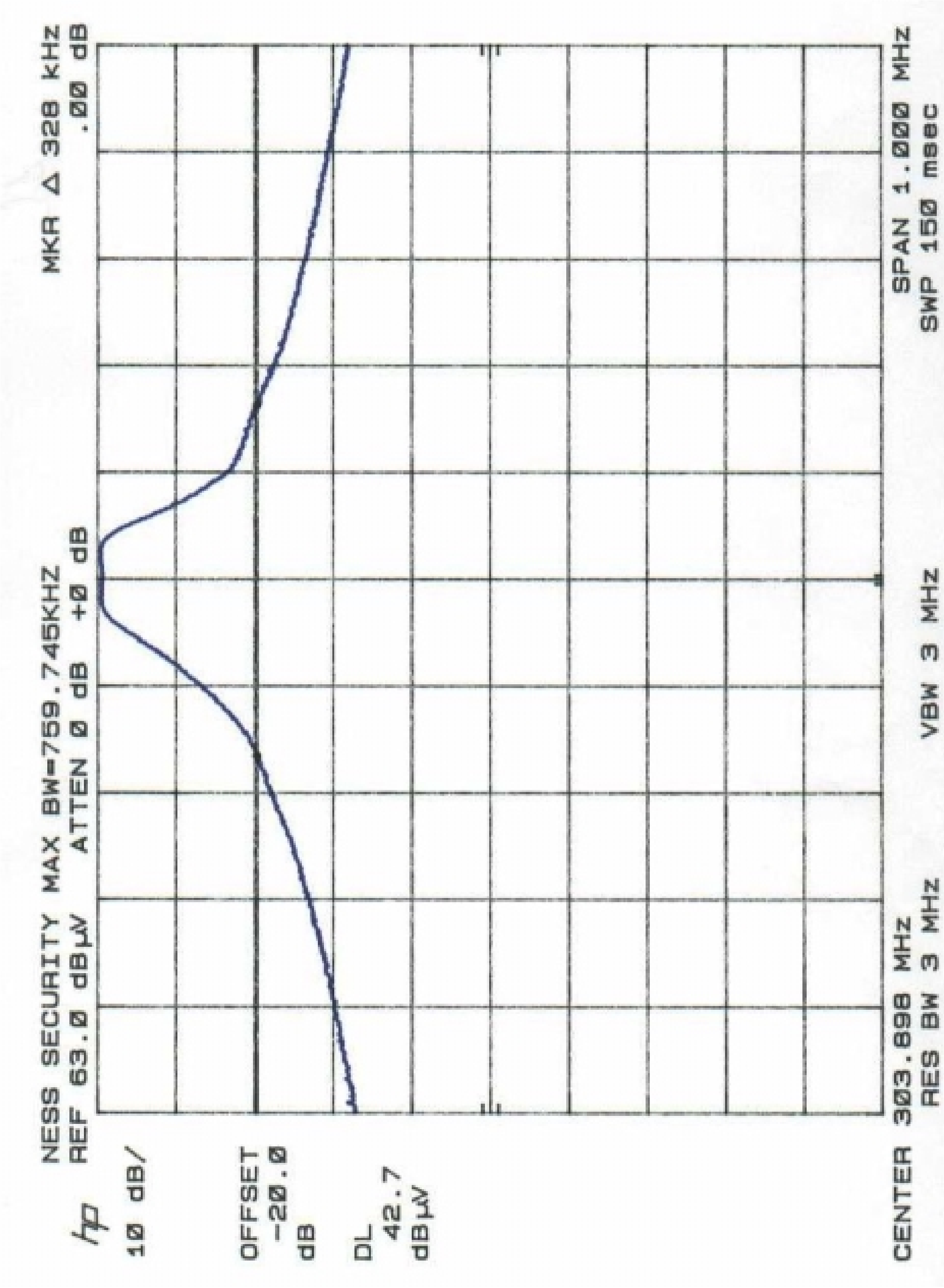
CARRIER BANDWIDTH DATA

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

Bandwidth Limit = Carrier Frequency x .0025

Bandwidth Limit = 303.9 MHz x .0025 = 759.75 kHz

Measured EUT Bandwidth = 328 kHz


NESS SECURITY MAX BW=759.745KHZ
REF 63.0 dBµV ATTEN 0 dB +0 dB
MKR Δ 328 kHz
.00 dB
10 dB/
OFFSET
-20.0
dB
DL
42.7
dBµV
CENTER 303.898 MHz
SPAN 1.000 MHz
RES BW 3 MHz
VBW 3 MHz
SWP 150 msec

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 = $0.5\ (2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3$ dB.