FCC CERTIFICATION TEST REPORT

for

Ness Security Products Pty Ltd.
4/167 Prospect Highway
Seven Hills NSW, NC 2147
Australia

FCC ID: O2K-RADD304

August 2, 2000

WLL PROJECT #:

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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 a Periodic Intentional Radiator under Part 15.231 of the FCC Rules and Regulations. The Equipment Under Test was the Ness Security Pty Ltd. Radio Dialler Model: RADD304.

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. Radio Dialle, Model: RADD304 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 Pty Ltd. RADD304 Radio Dialler (EUT) is used as part of a security alarm system and provides a wireless link between an SecurityGuard (SG3) alarm panel (FCC ID: O2K-SG3-304) and the Public Switching Telephone Network (PSTN). The Radio Dialler allows the SecurityGuard to report alarms to a central monitoring station via the telephone line. It also provides various control signals to the SecurityGuard alarm panel. Normal operation of the EUT is as follows: The unit receives a signal from the alarm panel transmitter to activate it. Upon activation the unit dials the contracted alarm company central station computer; the computer will answer the call, and send two verification tones. The Radio Dialler then sends its data sequence, and the central station will answer with a confirming tone.

The unit is configured with one RJ-11 PSTN jack. The Radio Dialler is powered via a 115VAC adapter that provides 18VAC to the unit. A battery is contained in the unit to provide back-up power in the event of a power failure.

2.1 On-board Oscillators

The Ness Security Products Pty Ltd. RADD304 Radio Dialler contains the following oscillators: 10MHz (Microprocessor clock), 32.768kHz, and a 303.825MHz SAW Oscillator.

3.0 Test Configuration

The EUT was mounted on a vertical board placed on the turn-table to simulate wall mounting by the consumer. All testing was performed at 120VAC.

I/O Ports	I/O Cables
RJ-11 PSTN port	1 meter, unshielded, unterminated
Input power	1.5 meter, unshielded, AC adapter to input power

3.1 Testing Algorithm

The transmitter was turned on and setup for providing continuous transmission during testing.

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. 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 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 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:	EμV/m = antilog (EdBμV/m/20)

Data is recorded in Table 2.

Table 1: FCC 15.231 Conducted Emissions Data

CLIENT:	Ness
MODEL:	Radio Dialer Transmitter
DATE:	7/24/00
VOLTAGE:	120VAC
BY:	Herb Meadows
JOB #:	5761X

LINE 1 - NEUTRAL

Frequency MHz	Level (QP) dBuV	Voltage uV	FCC Limit uV	Margin dB
0.56	19.7	9.7	250	-28.3
0.80	20.3	10.4	250	-27.7
1.06	18.8	8.7	250	-29.2
2.15	19.8	9.8	250	-28.2
7.73	19.5	9.4	250	-28.5
19.35	19.7	9.7	250	-28.3

LINE 2 - PHASE

Frequency MHz	Level (QP) dBuV	Voltage uV	FCC Limit uV	Margin dB
0.56	20.2	10.2	250	-27.8
0.72	19.7	9.7	250	-28.3
2.40	19.6	9.5	250	-28.4
4.36	18.6	8.5	250	-29.4
7.60	19.1	9.0	250	-28.9
13.70	19.2	9.1	250	-28.8

Table 2: FCC 15.231 3M Radiated Emissions Data

CLIENT: Ness
MODEL: Radio Dialer Transmitter
BY: Steven Koster
DATE: 7/24/00
JOB #: 5761X

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (Peak) dBuV	AFc dB/m	Duty Cycle Correction Factor (dB)	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB
303.91	V	270.0	1.5	57.6	16.3	-3.7	70.2	3229.0	5575.0	-4.7
303.91	H	45.0	1.5	54.4	16.3	-3.7	70.7	3420.3	5575.0	-4.2
911.69	H	180.0	1.5	4.7	25.6	-3.7	30.3	32.9	557.5	-24.6
911.70	V	247.5	1.5	2.7	25.6	-3.7	28.3	26.1	557.5	-26.6
1215.70	H	0.0	1	51.0	-9.5	-3.7	37.8	77.3	500.0	-16.2
1519.40	H	0.0	1.2	49.2	-7.1	-3.7	38.4	83.5	500.0	-15.5
1823.30	H	315.0	1.2	43.4	-5.0	-3.7	34.7	54.0	557.5	-20.3
2127.20	H	315.0	1	43.8	-3.6	-3.7	36.5	66.5	557.5	-18.5
2431.10	H	315.0	1	47.8	-2.9	-3.7	41.2	115.4	557.5	-13.7
2735.10	H	0.0	1	43.5	-2.2	-3.7	37.6	76.2	500.0	-16.3
3038.80	H	0.0	1	38.9	-1.6	-3.7	33.6	47.9	557.5	-21.3
1215.50	H	270.0	1	46.7	-9.5	-3.7	33.5	47.1	500.0	-20.5
1519.40	H	270.0	1	48.5	-7.1	-3.7	37.7	77.0	500.0	-16.2
1823.30	H	90.0	1	42.9	-5.0	-3.7	34.2	51.0	557.5	-20.8
2127.20	H	135.0	1	46.0	-3.6	-3.7	38.7	85.7	557.5	-16.3
2431.10	H	180.0	1	51.6	-2.9	-3.7	45.0	178.7	557.5	-9.9
2734.90	H	0.0	1	47.2	-2.2	-3.7	41.3	116.6	500.0	-12.6
3038.90	H	0.0	1	38.8	-1.6	-3.7	33.5	47.3	557.5	-21.4

Table 3: System Under Test

FCC ID: O2K-RADD304

EUT:	Ness Security Products Radio Dialler
	FCC ID: O2K-RADD304
Power Adapter:	18VAC, 400ma output, P/N: APX412056

Table 4: Interface Cables Used

RJ-11 phone line from Out port, 1 meter, unterminated.

The EUT was powered via a non-shielded AC power adapter 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-2520 (Site 1)
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
Washington Laboratories Portable Antenna Mast (Site 1)
Washington Laboratories Motorized Turntable (Site 1)

EXHIBIT 1

DUTY CYCLE CALCULATIONS

The following page shows 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.

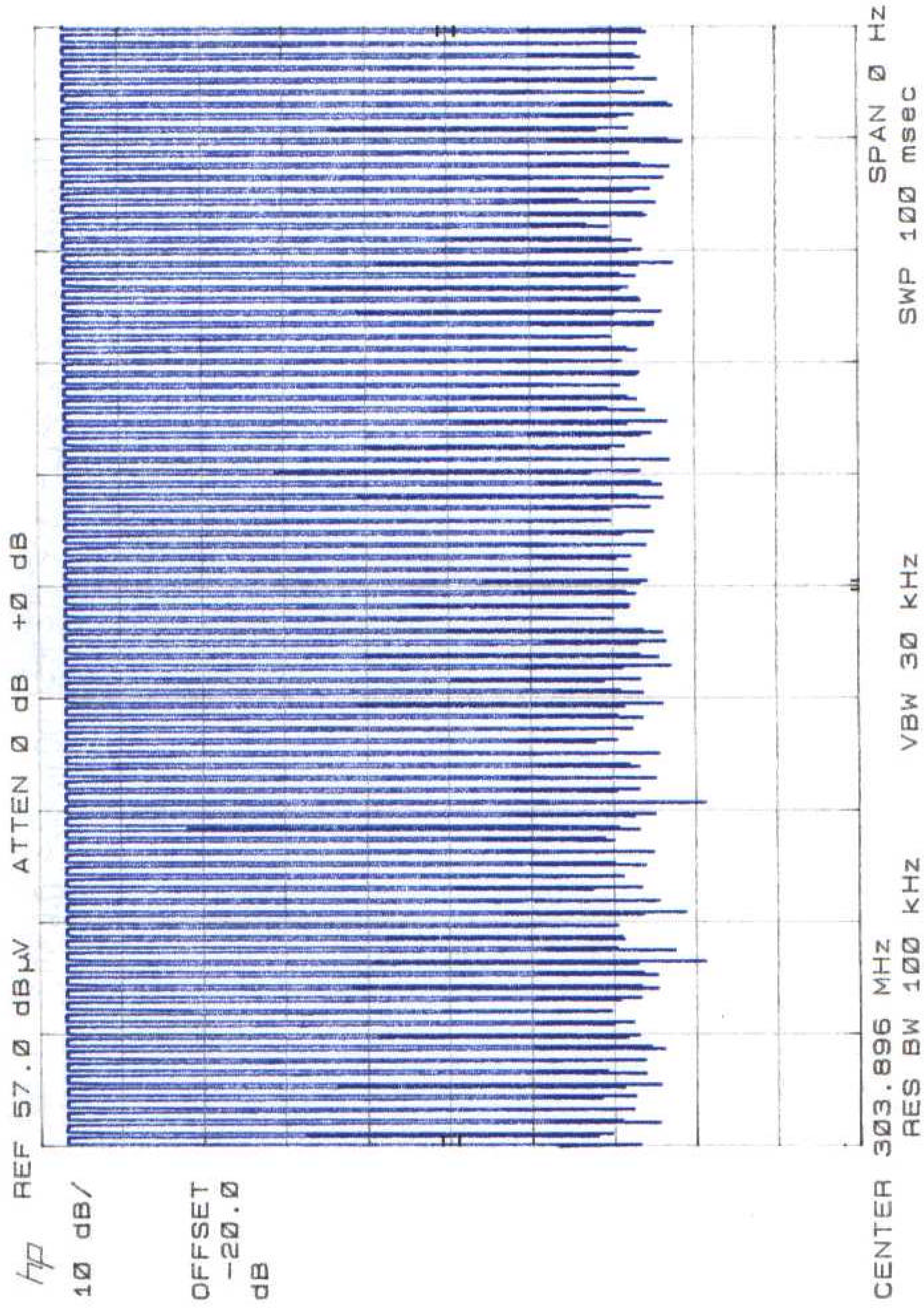
Plot 1 shows a continuous pulse train over a 100 ms period with 90 pulses occuring during this time. The width of the pulses are shown in Plot 2 and measured to be 720 us. From these plots, the following worst-case, 100 ms, duty cycle correction factor is calculated.

ON TIME PER PULSE TRAIN:

(91 x 720 us) = 65.52 ms ON TIME PER 100 ms Pulse Train

= 65.52 ms/100 ms = 0.655 Duty Cycle
= 65.5% Duty Cycle
= -3.7 dB AFd

Duty Cycle Plot 1



Duty Cycle Plot 2

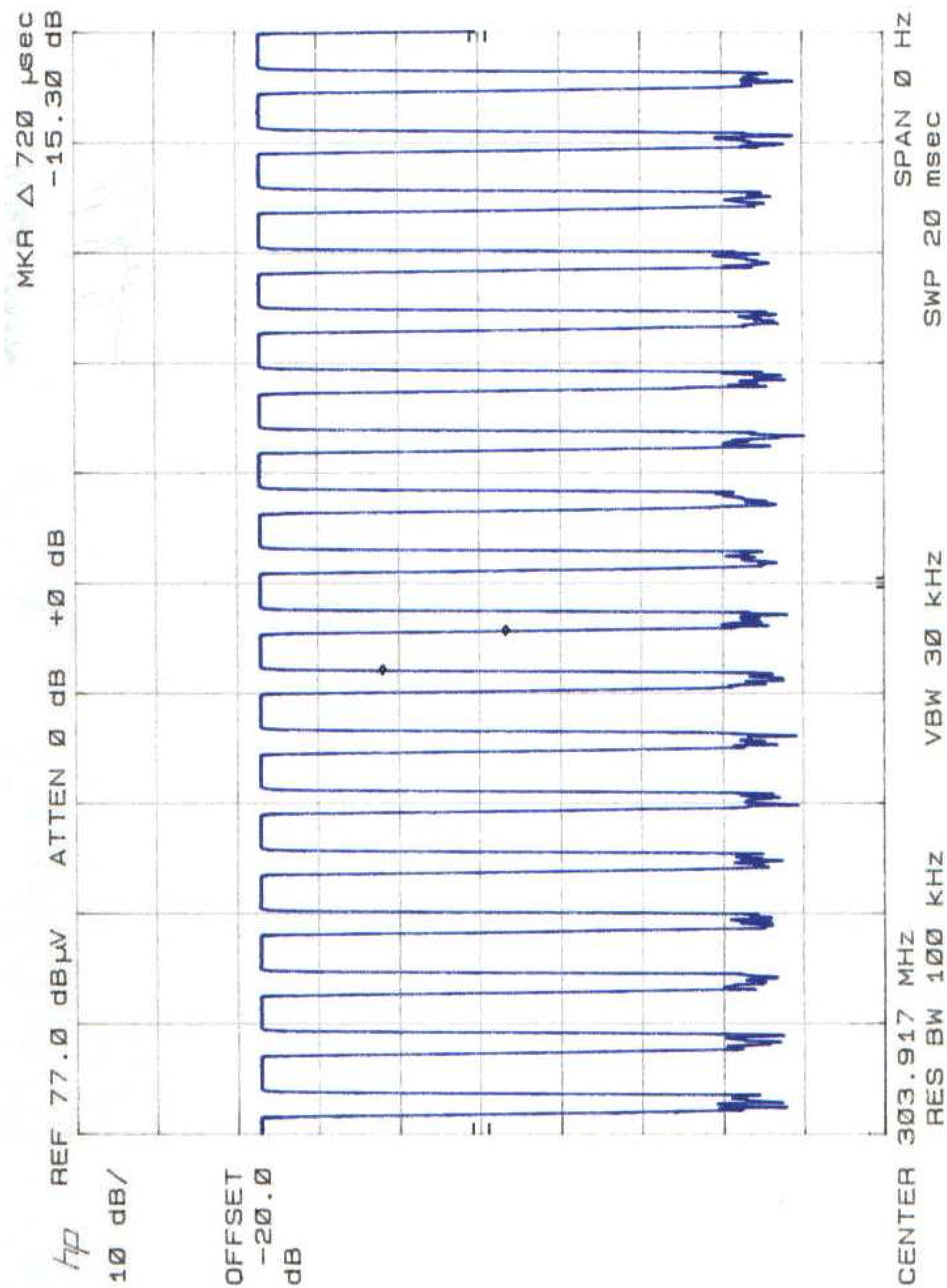


EXHIBIT 2

CARRIER BANDWIDTH DATA

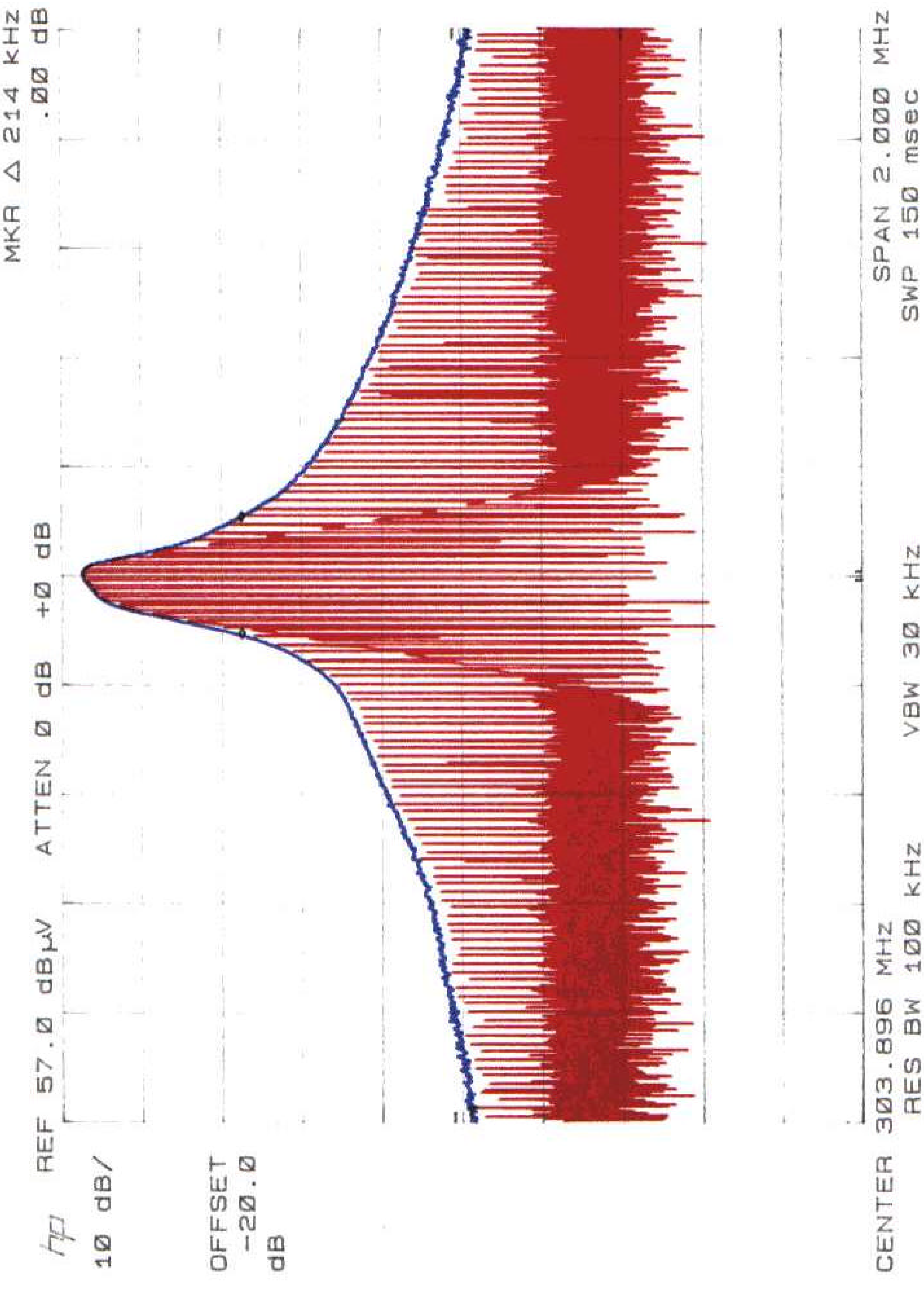
The 20 dB modulated bandwidth shall be no wider than 0.25% of the center frequency.

Bandwidth Limit = Carrier Frequency x .0025

Bandwidth Limit = 303.896 MHz x .0025 = 759.74 kHz

Measured EUT Bandwidth = 214 kHz

Bandwidth Plot



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.