FCC CERTIFICATION TEST REPORT

for

Tasco Products
9710 Farrar Court, Suite O
Richmond, VA 23236

FCC ID: PMM8046480565

May 2, 2001

WLL PROJECT #: 5911X

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1.0 Introduction

This report has been prepared on behalf of ILJ Corporation 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 CM-67 Club Minder.

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 ILJ Corporation CM-67 Club Minder complies with the limits for a Periodic Intentional Radiator under Part 15.231(e) of the FCC Rules and Regulations.

2.0 Description of Equipment Under Test (EUT)

The ILJ Corporation Club-Minder CM67 (EUT) is a device that is designed to prevent golfers from losing their clubs or leaving them behind when moving from one playing hole to another. The EUT a low power intentional radiator used in conjunction with a receiver. The receiver is clipped to the belt of a golfer. The transmitter is contained within a divot repair tool that a golf club handle rests upon. The transmitter transmits for a duration of 0.3 seconds every 10 seconds and if the belt clip receiver travels out of range of the signal an alarm is sounded.

2.1 On-board Oscillators

The ILJ Corporation CM-67 Club Minder contains the following oscillators: 32.768kHz, 315MHz SAW Oscillator.

3.0 Test Configuration

To complete the test configuration required by the FCC, the EUT was set for continuous transmission. The EUT was tested in all three orthogonal planes. All testing was performed with a fully charged 3VDC battery.

Worst case emissions are recorded in the data tables.

3.1 Conducted Emissions Testing

The EUT is a stand-alone, battery powered unit. Therefore, no conducted emissions testing were required.

3.2 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.

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 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 1.

Table 1: FCC 15.231(e) 3M Radiated Emissions Data

CLIENT: ILJ
MODEL NO: CM67
DATE: 6/12/00
BY: Greg Snyder
JOB #: 5911
Tx Frequency: 315 MHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level (QP) dBuV	Afd dB	Afc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB
315.00	V	45.00	2.5	48.1	-7.5	18.5	59.1	901.6	2634.0	-9.3
315.00	H	0.00	1.5	50.8	-7.5	18.5	61.8	1234.5	2634.0	-6.6
629.98	V	270.00	2.5	11.0	-7.5	25.1	28.6	26.9	263.4	-19.8
629.98	H	180.00	1.5	13.2	-7.5	25.1	30.8	34.7	263.4	-17.6
944.97	V	112.50	2.1	12.5	-7.5	31.7	36.7	68.4	263.4	-11.7
944.97	H	180.00	1.0	18.2	-7.5	31.7	42.4	131.8	263.4	-6.0

Average Measurements Above 1 GHz

Frequency MHz	Polarity H/V	Azimuth Degree	Antenna Height m	SA Level Peak dBuV	Afd dB	Afc dB/m	E-Field dBuV/m	E-Field uV/m	Limit uV/m	Margin dB	
1259.90	V	180.00	1.0	54.5	-7.5	-10.6	36.4	66.1	263.4	-12.0	
1259.90	H	180.00	1.0	54.3	-7.5	-10.6	36.2	64.6	263.4	-12.2	
1575.00	V	180.00	1.0	56.7	-7.5	-8.5	40.7	108.9	263.4	-7.7	
1575.00	H	225.00	1.0	55.7	-7.5	-8.5	39.7	97.1	263.4	-8.7	
1890.00	V	225.00	1.0	52.2	-7.5	-6.7	38.0	79.3	263.4	-10.4	
1890.00	H	247.50	1.0	50.3	-7.5	-6.7	36.1	63.7	263.4	-12.3	
2204.90	V	180.00	1.0	52.7	-7.5	-5.7	39.5	93.9	263.4	-9.0	
2204.90	H	225.00	1.0	51.0	-7.5	-5.7	37.8	77.2	263.4	-10.7	
2520.00	V	247.50	1.0	51.7	-7.5	-5.2	39.0	89.2	263.4	-9.4	
2520.00	H	0.00	1.0	50.5	-7.5	-5.2	37.8	77.7	263.4	-10.6	Amb
2835.00	V	0.00	1.0	49.8	-7.5	-4.7	37.6	75.8	263.4	-10.8	Amb
2835.00	H	0.00	1.0	50.0	-7.5	-4.7	37.8	77.5	263.4	-10.6	Amb
3149.90	V	225.00	1.0	50.5	-7.5	-4.3	38.7	86.3	263.4	-9.7	
3149.90	H	0.00	1.0	49.8	-7.5	-4.3	38.0	79.7	263.4	-10.4	Amb

Table 2: System Under Test

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EUT: ILJ Corporation EUT; M/N: Club-Minder CM67

Table 3: Interface Cables Used

The EUT is a stand-alone unit; therefore no interface cables were used during testing.

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

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.

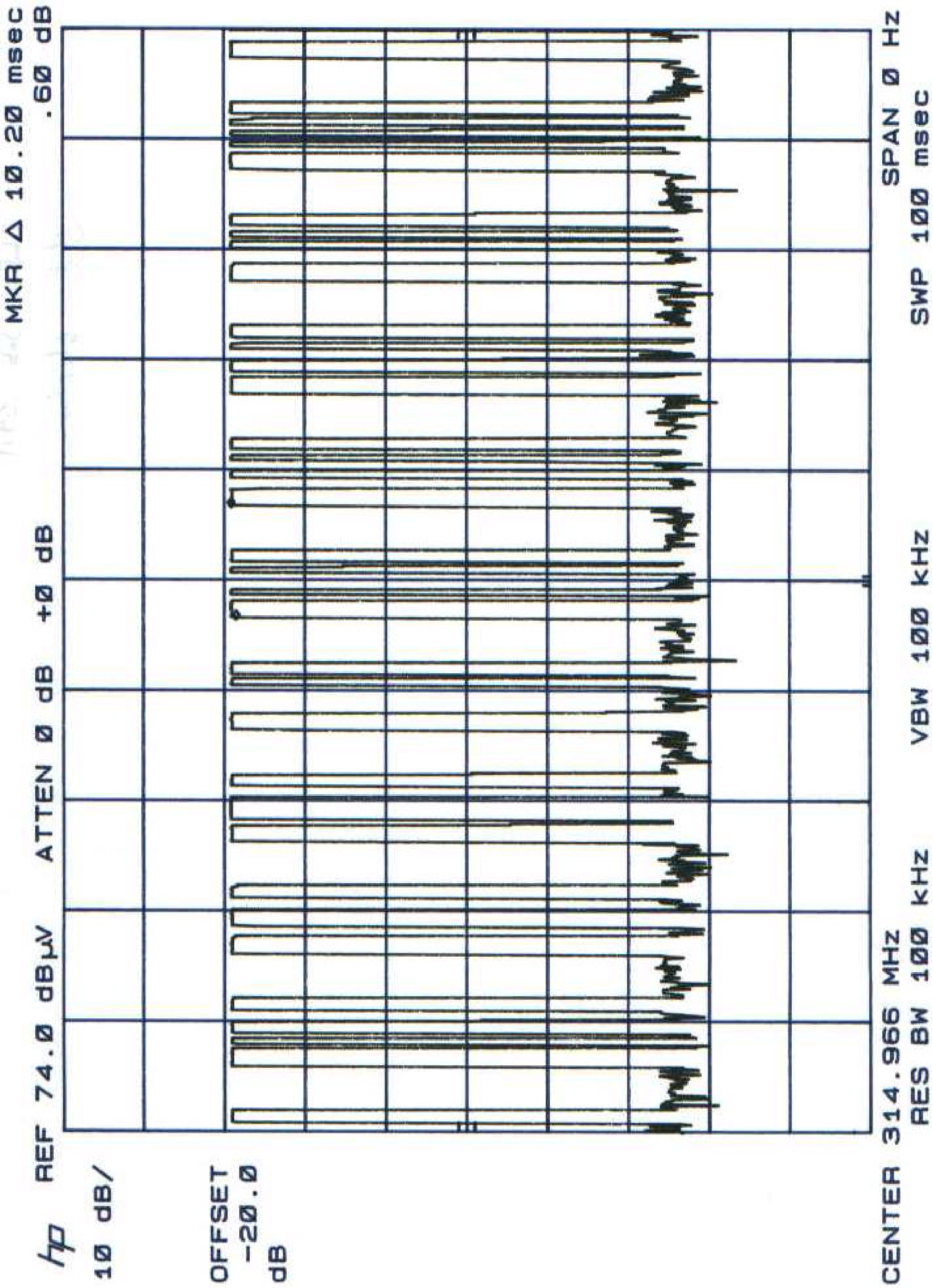
Plot 1 shows that the transmitter has a pulse train period of 10.2 ms and consists of varying lengths of pulses. The various pulse widths are measured on Plot 2. From this plot, the following duty cycle correction factor is calculated.

ON TIME PER PULSE TRAIN:

(2 x 1.44ms) + (1 x 980 us) + (1 x 420 us) = 4.28 ms ON TIME PER 10.2 ms Pulse Train

= 4.28 ms/10.2 ms = 0.4196 Duty Cycle
= 41.9% Duty Cycle
= -7.5 dB AFd

Duty Cycle Plot 1



Duty Cycle Plot 2

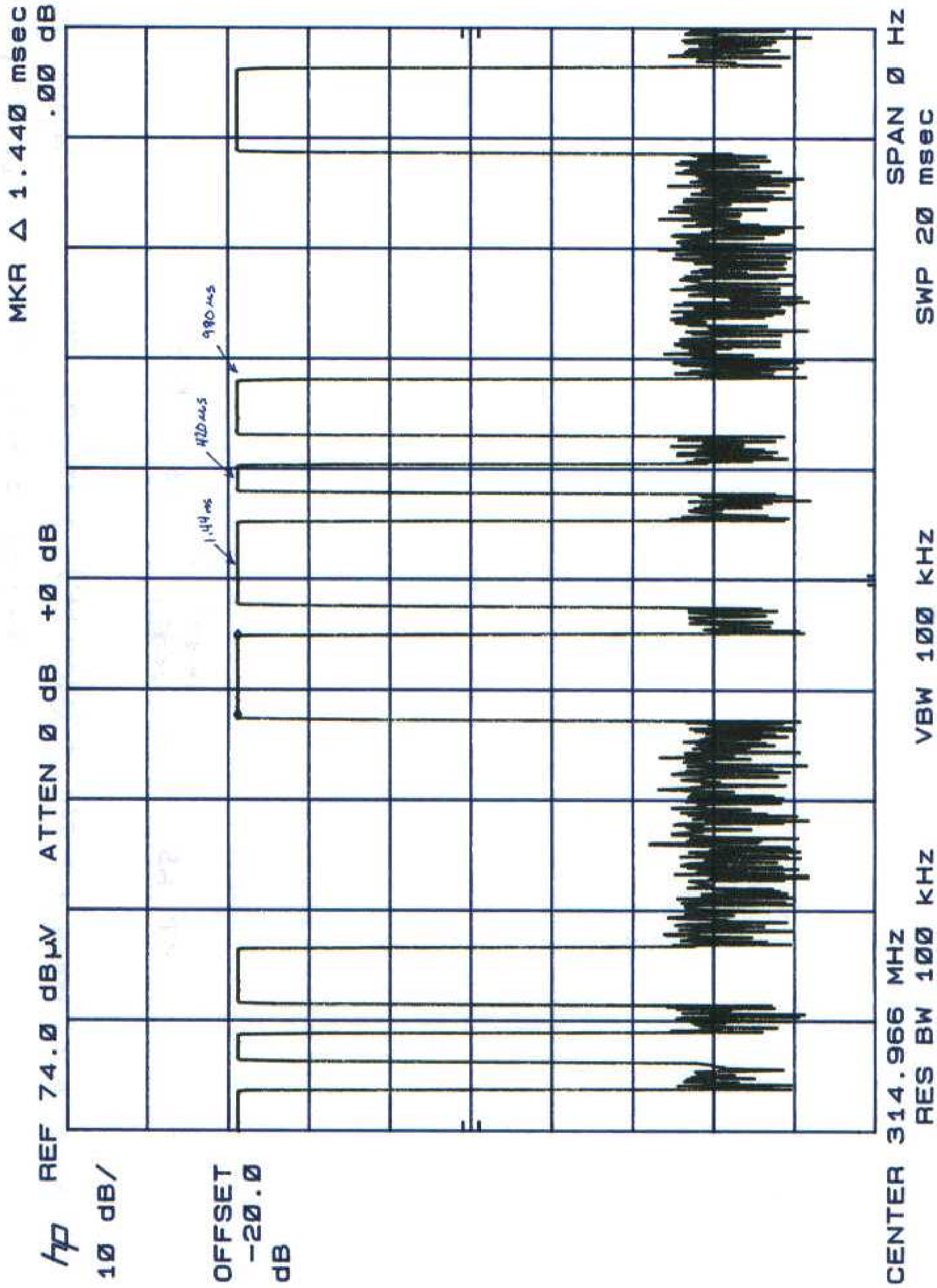


EXHIBIT 2

CARRIER BANDWIDTH DATA

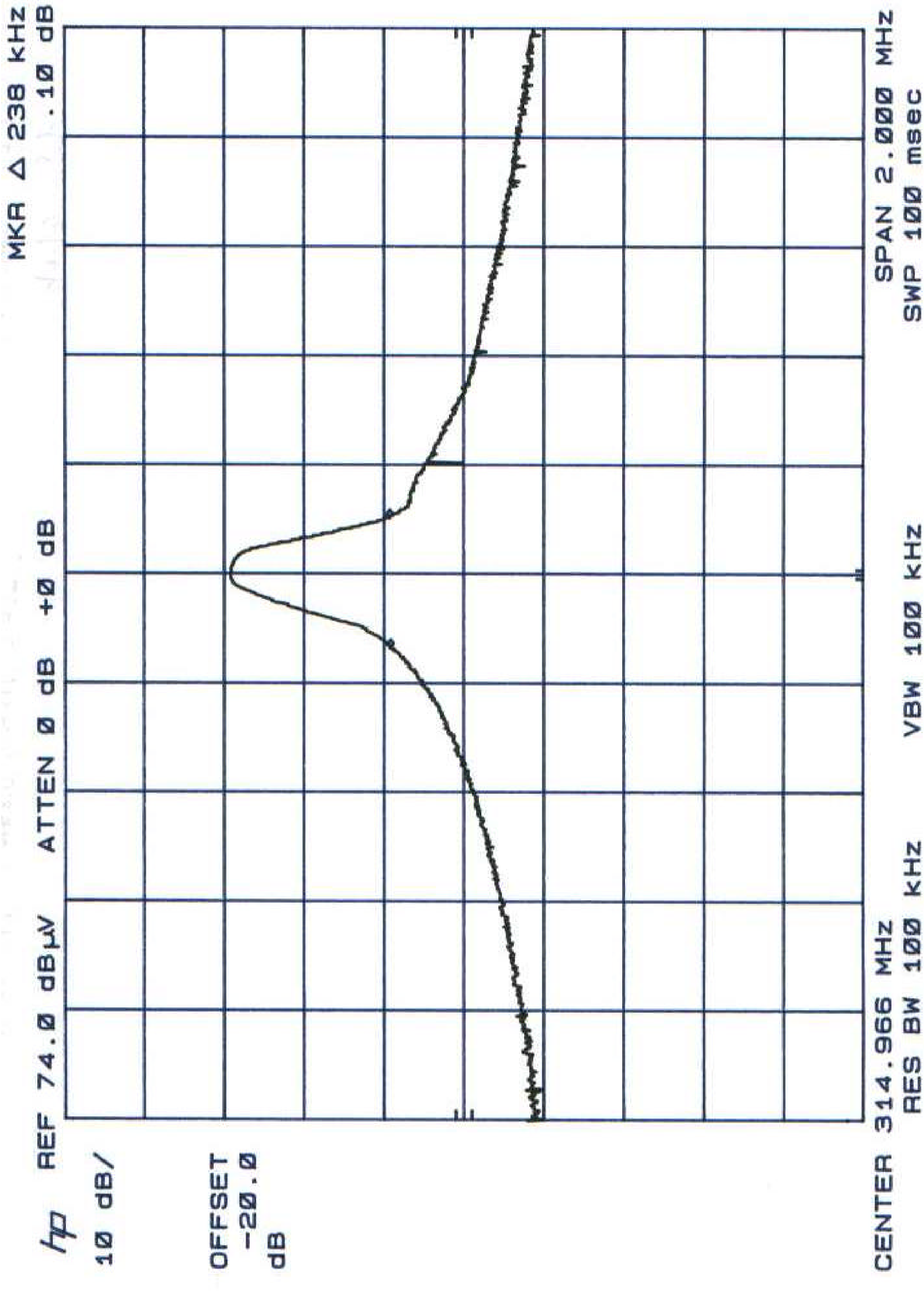
The 20 dB modulated bandwidth shall be no wider than 0.25% of the center frequency.

Bandwidth Limit = Carrier Frequency x .0025

Bandwidth Limit = 314.966 MHz x .0025 = 787.415 kHz

Measured EUT Bandwidth = 238 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.