DNB ENGINEERING, INC.
"One World, One EMC Solution"

CERTIFICATION REPORT FOR A LOW POWER TRANSMITTER

Per

47 CFR Part 15, Subpart C, Section 15.247
47 CFR Part 15, Subpart C, Section 15.209

EUT:VMX-100

PREPARED FOR APPLICANT:
Visionary Products Inc.
11814 S. Election Road Ste 200
Draper, UT. 84020

Nemko
ELA #116

NVLAP
NVLAP Lab Code 200634-0

REPORT # 56015-1
Test Completion Date: September 03, 2004

Prepared By:
DNB ENGINEERING, INC.
1100 East Chalk Creek Rd.
Coalville, Utah 84017
Tel: 1(435) 336-4433

EXECUTIVE SUMMARY

The purpose of this series of tests was to demonstrate the Electromagnetic Compatibility (EMC) characteristics of the VMX-100, the following tests were performed:

REQUIREMENTS	STATUS	COMPLIANT Yes/No/NA
47 CFR Part 15, Subpart C, Section 15.247	Transmitter Requirments	Yes
47 CFR Part 15, Subpart C, Section 15.209	Spurious Emissions	Yes

Signed By:

Clay Allred
Lab Manager
DNB Engineering Inc.

DOCUMENT HISTORY

Revision Letter	Number of Pages	Page No. of Rev.	Description	Date
	35		Document Release	9/22/04

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TRANSMITTAL SUMMARY

Unit tested:	VMX-100
Specifications:	**47 CFR Part 15, Subpart C, Section 15.247** **47 CFR Part 15, Subpart C, Section 15.209**
Purpose of Report:	This report was prepared to document the status of the VMX-100, with requirements of **47 CFR Part 15, Subpart C, Section 15.247 / 47 CFR Part 15, Subpart C, Section 15.209**
Test Summary:	The EUT's compliance status according to the tests performed is as follows: Refer to Page 2 Executive Summary.

CERTIFICATION OF TEST DATA

This report, containing emissions test data and evaluations, has been prepared by an independent electromagnetic compatibility laboratory, DNB ENGINEERING, in accordance with the applicable specifications and instructions required per the Introduction. NEMKO and the National Institute of Standards and Technology have evaluated DNB Engineering to do these tests for NVLAP.

NEMKO EMC Laboratory Authorization No.: ELA 116

NVLAP Lab Code: 200634-0

The data evaluation and equipment configuration presented herein are a true and accurate representation of the measurements of the test emissions characteristics as of the months and at the times of the test under the conditions herein specified.

Equipment Tested: VMX-100

Test Completion Date: Sept 03, 2004

Report Written By:

September 24, 2004

Carrie Yates
Quality Assurance Manager

Date

Report Reviewed By:

September 24, 2004

Clay Allred
Lab Manager

Date

1 INTRODUCTION

1.1 Administrative Data and Test Description

Responsible Party: **Visionary Products Inc**
11814 S. Election Road Ste 200
Draper, UT. 84020
Contact: Jeremy Williams
Phone: 801-495-2310
Test Completion Date: September 03, 2004
Equipment Under Test: VMX-100
FCC ID: SJNVMX-100

1.2 Test Configuration

Config - uration	Unit Name - Processor, Monitor, Printer, Cable, etc. (indent for features of a unit)	Style/Model/ Part No.	Serial Number	Obj. of test	VAC 120	Comments/ FCC ID#
	Blue Tooth Compatible Transmitter	VMX 100		X		SJNVMX-100
	SUPPORT EQUIPMENT					
	EmMchines PC	700id	CFI27ADA00056		120v	
	Monitor Likom Technology	L7035LD	8AMLLC0040935			
	EMachines Mouse	Ergo+				
	Emachines Keyboard	ACK-260	203358935V3(PS/2)			

X - Specific device(s) for which this test is being conducted

1.3 Equipment Description

Operational Description: The VMX-100 is a Bluetooth compatible 2.4GHz radio. It can be integrated into many different devices using the three antenna types. The Bluetooth radio uses the CSR BC02 chip. A 16MHz crystal is used as the timing source for the generation of all transmission frequencies. The CSR BC02 radio chip is in full compliance with the frequency hopping requirements detailed in the Bluetooth 1.1 specification. The CSR BC02 uses all 79 channels equally on average. The CSR BC02 receiver hops in synchronization with the associated transmitter. The CSR BC02 generates a pseudorandom sequence that is used to control the hopping sequences. The chip evenly distributes a continuous stream of data over the 79 channels. This even distribution is realized even with a short burst of data.

Description of protection covering control, tuning and filtering circuitry of receivers: The VMX-100 has an EMI shield can that covers all of the circuitry except for the 3.0 V regulator and the front-end pi filter and antennas. The receiver circuitry for the VMX-100 has some discrete filtering and a low noise amplifier. All other functions are performed internally to the CSR radio.

1.4 Mode of Operation

The VMX-100 was set in normal operation of pseudorandom spread spectrum frequency hoping for the spurious emissions measurements. The EUT was set to be held at a single channel (channel 1 Lower, channel 38 Middle and channel 79 upper) for the harmonics and fundamental frequency measurements. The device is USB bus powered therefore a pc with a USB cable connected to the transmitter was set under the wooden table for all of the testing.

1.5 Antenna Information

Run 1.2 was performed with the EUT using a Portable "Rubber Duck" antenna manufactured by Nearson. (Model number S151)

Run 1.3 was performed with the EUT using a PCB Mount antenna manufactured by Tyco/Centurion. (Model number 100902 Visionary Products Part Number V001579)

Run 1.4 was performed with the EUT using a custom dipole antenna manufactured by Visionary Products. (Visionary Products Part Number V003515.)

1.6 Documented EMC Control Measures

Reduced power output of the transmitter.

1.7 Clock Frequencies

16 MHz & 2.4GHz

1.8 Test Voltage

USB Bus powered

1.9 Justifications

None

1.10 Block Diagram

See Appendix A for Attachment Information

1.11 Internal Photograph Equipment Under Test (EUT)

EUT: VMX-100
View: EUT

See Appendix A for Attachment Information

1.12 External Photograph Equipment Under Test (EUT)

EUT: VMX-100
View: EUT

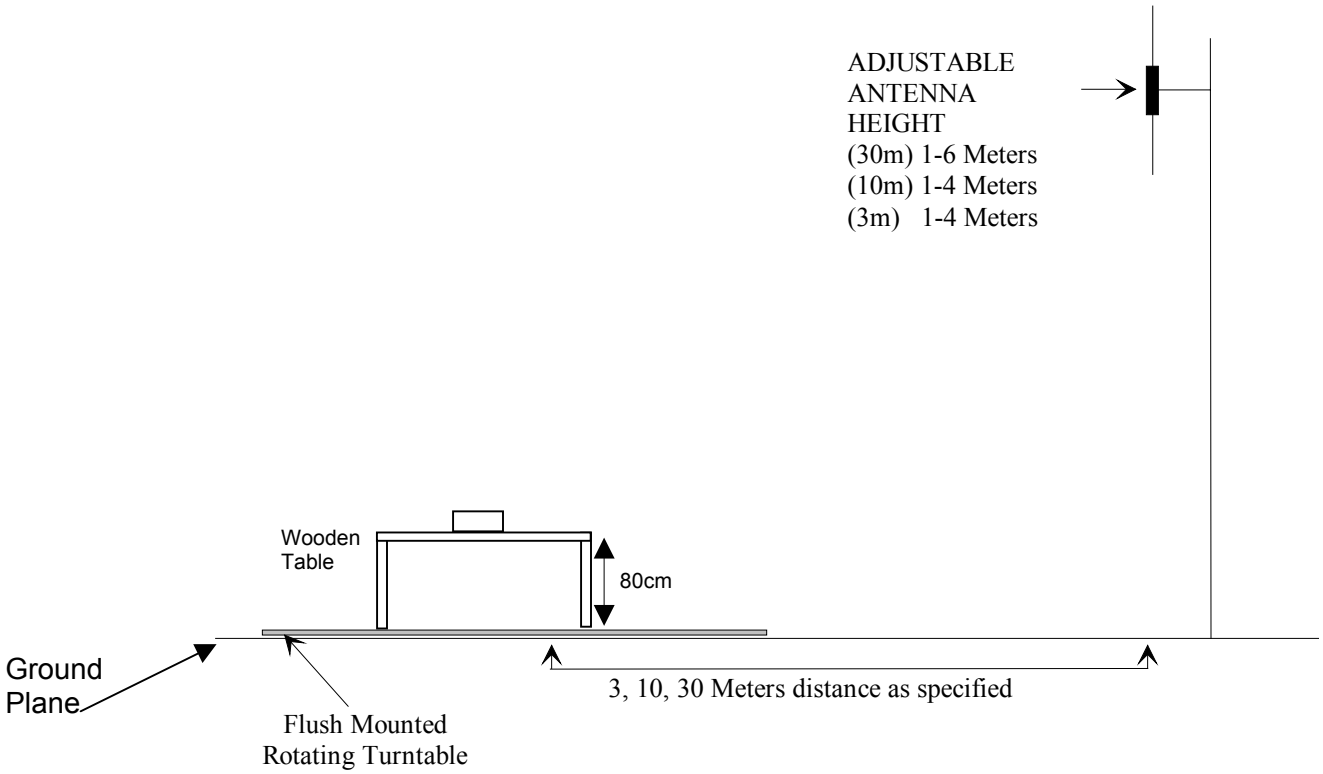
See Appendix A for Attachment Information

2 SPURIOUS EMISSIONS PER PART 15, SUBPART C, SECTION 15.209

2.1 Radiated Emissions Test Setup and Procedure

The EUT was placed on a wooden table 1 meter wide and 1.5 meters long which rests on a flush mounted, steel-top turntable on the open area test site as shown in Section 1.14 The top of the table is 80 cm above the ground plane. The turntable can be rotated 360 degrees. Measuring antenna is set at the prescribed distance. Measurements are made with broadband antennas that have been correlated with tuned dipole antennas. The mast is 4.5 meters high and is self-supporting. The height of the antenna can be varied from 1 to 4 meters. Positioning of the antenna is controlled remotely.

Open Area Test Site



Radiated Test Setup and Procedure

The EUT is put into the operational test mode as stated in Section 1.4 and then started.

The spectrum analyzer is setup to store the peak emission over the frequency range of the antenna. Peak EUT and ambient emissions are stored while the turntable is rotated 360^0. The Peak spectrum analyzer trace is then plotted with the addition of antenna and cable correction factors. The limit is plotted on the same graph. A receiver with CISPR Quasi Peak detector is then used on the frequencies identified as the highest with respect to the plotted limit. Ambients are noted on the graph along with EUT emissions. The highest emissions are maximized.

To maximize emissions levels, the turntable is rotated and the antenna is raised and lowered to determine the point of maximum emanations. The cables are then manipulated at that point to maximize emissions. Measurements are made with the antennas in each horizontal and vertical polarization. The data obtained from these tests is corrected with the proper cable, preamplifier and antenna factors. The results are then transcribed onto tables that show the maximum emission levels. The highest emissions are listed in a Radiated Emissions Summary table.

If no emissions can be found, the lowest harmonics of the EUT clocks within the bands of the standard are tuned to with the receiver. If no emissions are found, the noise floor will be entered into the table and noted. A minimum of six frequencies will be logged. Summary results will reflect only actual emissions from the EUT.

The field intensity measurements are made using standard techniques with a spectrum analyzer or EMI receiver as the calibrated Field Intensity Meter (FIM). Preamplifiers and filters are used when required.

When using the Hewlett Packard Model 8568B Spectrum Analyzer as the FIM, the Analyzer is calibrated to read signal level in dBm. Where:

0 dBm (50 ohms) = 107 dBµV (50 ohms)

The signal level (dBµV) = indicated signal level (dBm) + 107 dB. To obtain the signal level in dBµV/m it is necessary to add the antenna factor in dB.

All emissions below 1 GHz were recorder using a EMI receiver with Quasi Peak detector employing 120 kHz bandwidth. All emissions above 1GHz were measured using a Spectrum Analyzer in either Peak, or Average mode with a resolution Bandwidth of 1 MHz and a video bandwidth of 3 MHz.

Example of Typical Calculation

Measurement Distance = 3 Meter

Rohde and Schwarz reading @ 60 MHz	49.0	dBµV
Antenna Factor	+7.5	dB/m
Cable Loss	+2.0	dB
Preamplifier	-25.5	dB
	-16.0	dB/m
Field Strength dBµV/m at 3 Meter =	33.0	dBµV/m

2.2 Radiated Emissions Compliance Data

Spurious Radiated Emissions Summary Test Data
47 CFR Part 15, Subpart C, Sections 15.247 and 15.209 class B at 3 meters

Run 1.2 Channel 1 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
12009.530	28.5	26.7	11.4	40.7	25.3	**53.83**	54.0	**-0.17**	**55**	1.1	Vert	Ave
12010.300	27.2	26.7	11.4	40.6	25.2	**52.43**	54.0	**-1.57**	**360**	1.5	Hor	Ave
7205.540	37.6	30.2	7.0	37.5	14.4	**52.01**	54.0	**-1.99**	**48**	1.5	Hor	Peak
9607.490	27.2	27.8	9.0	38.9	20.1	**47.28**	54.0	**-6.72**	**137**	1.1	Vert	Peak
7205.840	28.9	30.2	7.0	37.7	14.6	**43.49**	54.0	**-10.51**	**118**	1.1	Vert	Ave
4804.450	32.4	28.8	5.5	33.7	10.5	**42.85**	54.0	**-11.15**	**68**	1.1	Vert	Ave
4803.660	31.0	28.8	5.5	33.8	10.6	**41.55**	54.0	**-12.45**	**175**	1.8	Hor	Ave

Run 1.2 Channel 38 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
12204.550	27.7	26.6	11.6	41.0	26.0	**53.68**	54.0	**-0.32**	**79**	1.5	Vert	Ave
12204.210	26.6	26.6	11.6	40.9	25.9	**52.53**	54.0	**-1.47**	**92**	1.1	Hor	Ave
4882.300	39.8	28.8	5.6	34.2	10.9	**50.73**	54.0	**-3.27**	**57**	1.1	Hor	Peak
7322.420	29.8	30.1	7.1	37.5	14.5	**44.32**	54.0	**-9.68**	**250**	1.5	Vert	Ave
4881.880	31.6	28.8	5.6	34.1	10.8	**42.37**	54.0	**-11.63**	**65**	1.5	Vert	Ave
7322.420	28.1	30.1	7.1	37.3	14.3	**42.34**	54.0	**-11.66**	**84**	1.1	Hor	Ave

Run 1.2 Channel 79 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
7440.420	38.8	30.0	7.2	37.0	14.2	**52.97**	54.0	**-1.03**	**189**	1.5	Hor	Peak
4960.260	41.1	28.9	5.6	34.4	11.2	**52.25**	54.0	**-1.75**	**30**	1.1	Vert	Peak
7440.020	28.3	30.0	7.2	37.3	14.4	**42.69**	54.0	**-11.31**	**211**	1.1	Vert	Ave
4960.100	30.3	28.9	5.6	34.5	11.2	**41.55**	54.0	**-12.45**	**32**	1.1	Hor	Ave

Run 1.2 Spurious 30-1000 MHz

Visionary Products Inc	EUT: VMX-100

Freq. (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dB)	Corrected signal (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Antenna Horz/Vert
300.789	42.1	25.6	3.7	18.8	-3.1	**39.00**	46.0	**-7.00**	**Horz**
702.105	3.0	27.2	5.9	23.1	1.8	**38.10**	46.0	**-7.90**	**Horz**
701.701	37.2	27.2	5.9	22.8	1.5	**38.70**	46.0	**-7.30**	**Vert**
300.684	47.5	25.6	3.7	17.6	-4.3	**43.20**	46.0	**-2.80**	**Vert**
299.282	43.6	25.7	3.7	20.3	-1.7	**41.90**	46.0	**-4.10**	**Vert**
90.798	51.2	26.4	2.1	9.2	-15.1	**36.10**	43.5	**-7.40**	**Vert**

Run 1.3 ch 1 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
4803.840	42.3	28.8	5.5	33.7	10.5	**52.80**	54.0	**-1.20**	**96**	1.3	Vert	Peak
12009.450	25.8	26.7	11.4	40.7	25.3	**51.08**	54.0	**-2.92**	**119**	1.2	Vert	Ave
4803.900	39.9	28.8	5.5	33.8	10.6	**50.45**	54.0	**-3.55**	**198**	1.3	Hor	Peak

Run 1.3 ch 38 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
4803.840	42.3	28.8	5.5	33.7	10.5	**52.80**	54.0	**-1.20**	**96**	1.3	Vert	Peak
12009.450	25.8	26.7	11.4	40.7	25.3	**51.08**	54.0	**-2.92**	**119**	1.2	Vert	Ave
4803.900	39.9	28.8	5.5	33.8	10.6	**50.45**	54.0	**-3.55**	**198**	1.3	Hor	Peak

Run 1.3 ch 79 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
7440.680	28.1	30.0	7.2	37.3	14.4	**42.54**	54.0	**-11.46**	**118**	1.5	Vert	Ave
4959.840	30.4	28.9	5.6	34.5	11.2	**41.65**	54.0	**-12.35**	**152**	3.0	Hor	Ave
4959.540	30.0	28.9	5.6	34.4	11.1	**41.15**	54.0	**-12.85**	**119**	2.5	Vert	Ave
7440.340	26.0	30.0	7.2	37.0	14.2	**40.12**	54.0	**-13.88**	**106**	2.0	Hor	Ave

Run 1.3 Spurious 30-1000 MHz

Visionary Products Inc	EUT: VMX-100

Freq. (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dB)	Corrected signal (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Antenna Horz/Vert
300.724	47.5	25.6	3.7	17.6	-4.3	**43.20**	46.0	-2.8	Vert
701.943	40.7	27.2	5.9	22.8	1.5	**42.20**	46.0	-3.8	Vert
701.953	39.2	27.2	5.9	23.1	1.8	**41.00**	46.0	-5.0	Hor
299.135	41.5	25.7	3.7	20.3	-1.7	**39.80**	46.0	-6.2	Vert
39.372	43.6	26.4	1.4	14.1	-10.9	**32.70**	40.0	-7.3	Vert
300.723	41.4	25.6	3.7	18.8	-3.1	**38.30**	46.0	-7.7	Hor

Run 1.4 Ch 1 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dB/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
12009.540	27.2	26.7	11.4	40.7	25.3	**52.53**	54.0	**-1.47**	**86**	1.5	Vert	Peak
4804.400	40.9	28.8	5.5	33.8	10.6	**51.50**	54.0	**-2.50**	**192**	2.0	Hor	Peak
4804.060	39.9	28.8	5.5	33.7	10.5	**50.35**	54.0	**-3.65**	**272**	1.1	Vert	Peak
7206.640	26.5	30.2	7.0	37.7	14.6	**41.04**	54.0	**-12.96**	**48**	2.0	Vert	Ave

Run 1.4 ch 38 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dB/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
12204.380	27.0	26.6	11.6	41.0	26.0	**52.98**	54.0	**-1.02**	**47**	2.0	Vert	Ave
7323.020	38.4	30.1	7.1	37.5	14.5	**52.87**	54.0	**-1.13**	**37**	2.0	Vert	Peak
4882.500	39.0	28.8	5.6	34.2	10.9	**49.88**	54.0	**-4.12**	**148**	2.5	Hor	Peak
7321.820	26.6	30.1	7.1	37.3	14.3	**40.89**	54.0	**-13.11**	**103**	3.0	Hor	Ave
4882.320	29.7	28.8	5.6	34.1	10.8	**40.53**	54.0	**-13.47**	**276**	3.3	Vert	Ave

Run 1.4 ch 79 Harmonics/Spurious

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dB/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
4960.450	31.9	28.9	5.6	34.5	11.3	**43.15**	54.0	**-10.85**	**76**	3.0	Hor	Ave
4959.820	31.0	28.9	5.6	34.4	11.1	**42.15**	54.0	**-11.85**	**65**	3.3	Vert	Ave
7440.200	27.4	30.0	7.2	37.0	14.2	**41.57**	54.0	**-12.43**	**100**	1.3	Hor	Ave
7440.300	27.0	30.0	7.2	37.3	14.4	**41.44**	54.0	**-12.56**	**107**	1.5	Vert	Ave

Run 1.4 Spurious 30-1000 MHz

Visionary Products Inc	**EUT: VMX-100**

Freq. (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dB)	**Corrected signal (dBuV/m)**	Limit (dBuV/m)	**Delta (dB)**	**Antenna Horz/Vert**
300.692	48.0	25.6	3.7	17.6	-4.3	**43.70**	46.0	**-2.30**	Vert
299.265	43.4	25.7	3.7	20.3	-1.7	**41.70**	46.0	**-4.30**	Vert
701.828	39.9	27.2	5.9	22.8	1.5	**41.40**	46.0	**-4.60**	Vert
128.000	46.1	26.2	2.5	14.0	-9.7	**36.40**	43.5	**-7.10**	Vert
299.145	38.8	25.7	3.7	21.0	-1.0	**37.80**	46.0	**-8.20**	Hor/
751.921	34.9	27.3	6.2	23.7	2.6	**37.50**	46.0	**-8.50**	Hor/

- Highest frequencies relative to the Limit.

2.3 Radiated Emissions Fundamental Frequency Compliance Data

Fundamental Frequency Radiated Emissions Summary Test Data
47 CFR Part 15, Subpart C, Section 15.247 at 3 meters

Run 1.2 Channel 1 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2402.140	85.8	26.8	3.8	30.2	7.2	**93.03**	128.0	**-34.97**	**324**	1.1	Vert	PK
2401.880	73.0	26.8	3.8	30.0	7.0	**79.99**	128.0	**-48.01**	**214**	1.5	Hor	PK

Run 1.2 Channel 38 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2440.890	81.6	26.9	3.9	30.3	7.3	**88.90**	128.0	**-39.10**	**265**	1.5	Vert	PK
2440.850	71.9	26.9	3.9	30.0	7.0	**78.93**	128.0	**-49.07**	**66**	1.1	Hor	PK

Run 1.2 Channel 79 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2479.910	82.3	26.9	3.9	30.4	7.4	**89.66**	128.0	**-38.34**	**336**	1.1	Vert	PK
2479.830	71.4	26.9	3.9	30.1	7.1	**78.48**	128.0	**-49.52**	**71**	1.5	Hor	PK

Run 1.3 Channel 1 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2402.000	80.9	26.8	3.8	30.0	7.0	**87.89**	128.0	**-40.11**	**14**	1.3	Hor	PK
2401.900	74.4	26.8	3.8	30.2	7.2	**81.63**	128.0	**-46.37**	**360**	1.3	Vert	PK

Run 1.3 Channel 38 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2440.890	80.2	26.9	3.9	30.0	7.0	**87.23**	128.0	**-40.77**	**50**	1.1	Hor	PK
2440.880	74.2	26.9	3.9	30.3	7.3	**81.50**	128.0	**-46.50**	**293**	1.1	Vert	PK

Run 1.3 Channel 79 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2480.250	78.8	26.9	3.9	30.1	7.1	**85.88**	128.0	**-42.12**	**46**	1.1	Hor	PK
2480.190	73.2	26.9	3.9	30.4	7.4	**80.57**	128.0	**-47.43**	**314**	1.1	Vert	PK

Run 1.4 Channel 1 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2401.970	81.5	26.8	3.8	30.2	7.2	**88.73**	128.0	**-39.27**	**21**	1.1	Vert	PK
2401.850	76.9	26.8	3.8	30.0	7.0	**83.89**	128.0	**-44.11**	**175**	1.5	Hor	PK

Run 1.4 Channel 38 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2441.060	79.0	26.9	3.9	30.3	7.3	**86.30**	128.0	**-41.70**	**60**	1	Vert	PK
2441.040	75.5	26.9	3.9	30.0	7.0	**82.54**	128.0	**-45.46**	**172**	1.8	Hor	PK

Run 1.4 Channel 79 Fundamental Frequency

Visionary Products Inc	EUT: VMX-100

Freq (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor Vert	Meas. Type Ave, PK
2479.850	77.7	26.9	3.9	30.4	7.4	**85.06**	128.0	**-42.94**	**360**	2.0	Vert	PK
2479.910	73.0	26.9	3.9	30.1	7.1	**80.08**	128.0	**-47.92**	**83**	3.0	Hor	PK

2.4 Radiated Emissions Bandwidth Compliance Data

Radiated Emissions Bandwidth Summary Test Data
47 CFR Part 15, Subpart C, Section 15.247 at 3 meters

2.5 Test Description

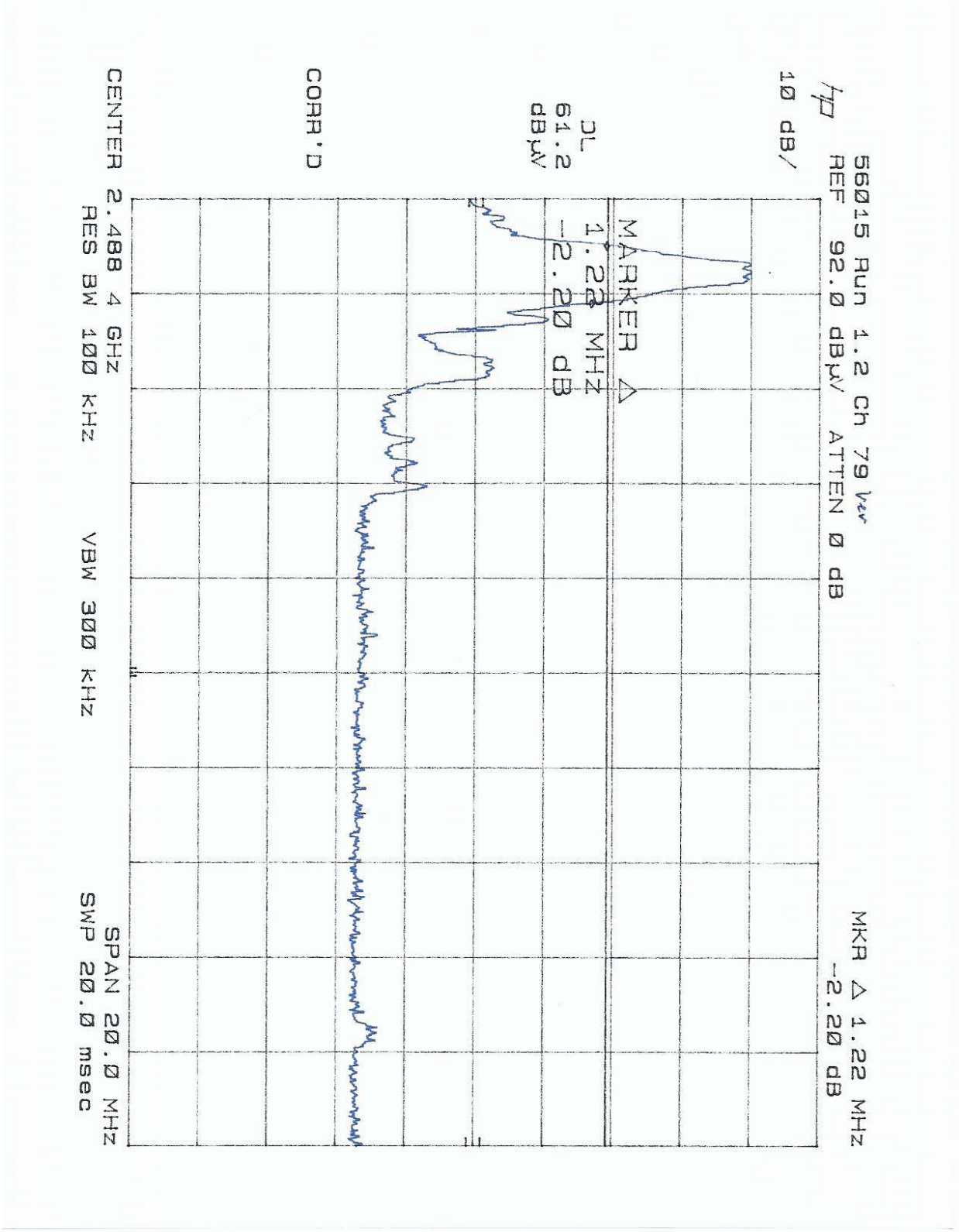
The EUT was set to the lowest operating channel and the highest operating channel and the EUT was configured to produce the highest Peak emissions. The spectrum analyzer was set with bandwidths below and the point, which was recorded to be 20 dB below the peak, was noted. Any emissions beyond the specified Frequency Band, noted below, that were over this 20 dB level was recorded as a failure.

Resolution Bandwidth = 100kHz
Video Bandwidth = 300kHz
Frequency Range under test = 2.4GHz – 2.483.5GHz

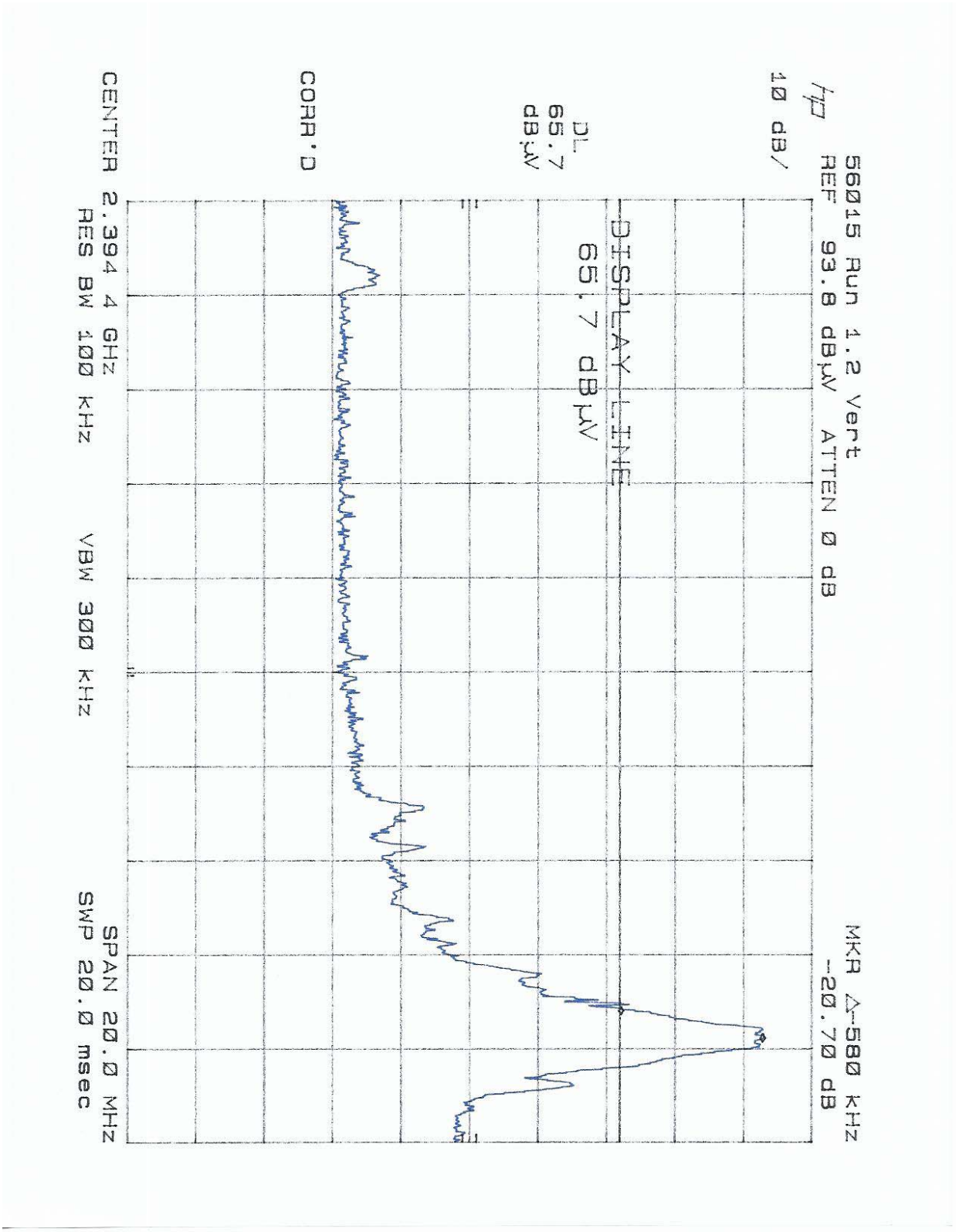
See Following sections for test plots.

2.6 Radiated Emissions Bandwidth Compliance Data

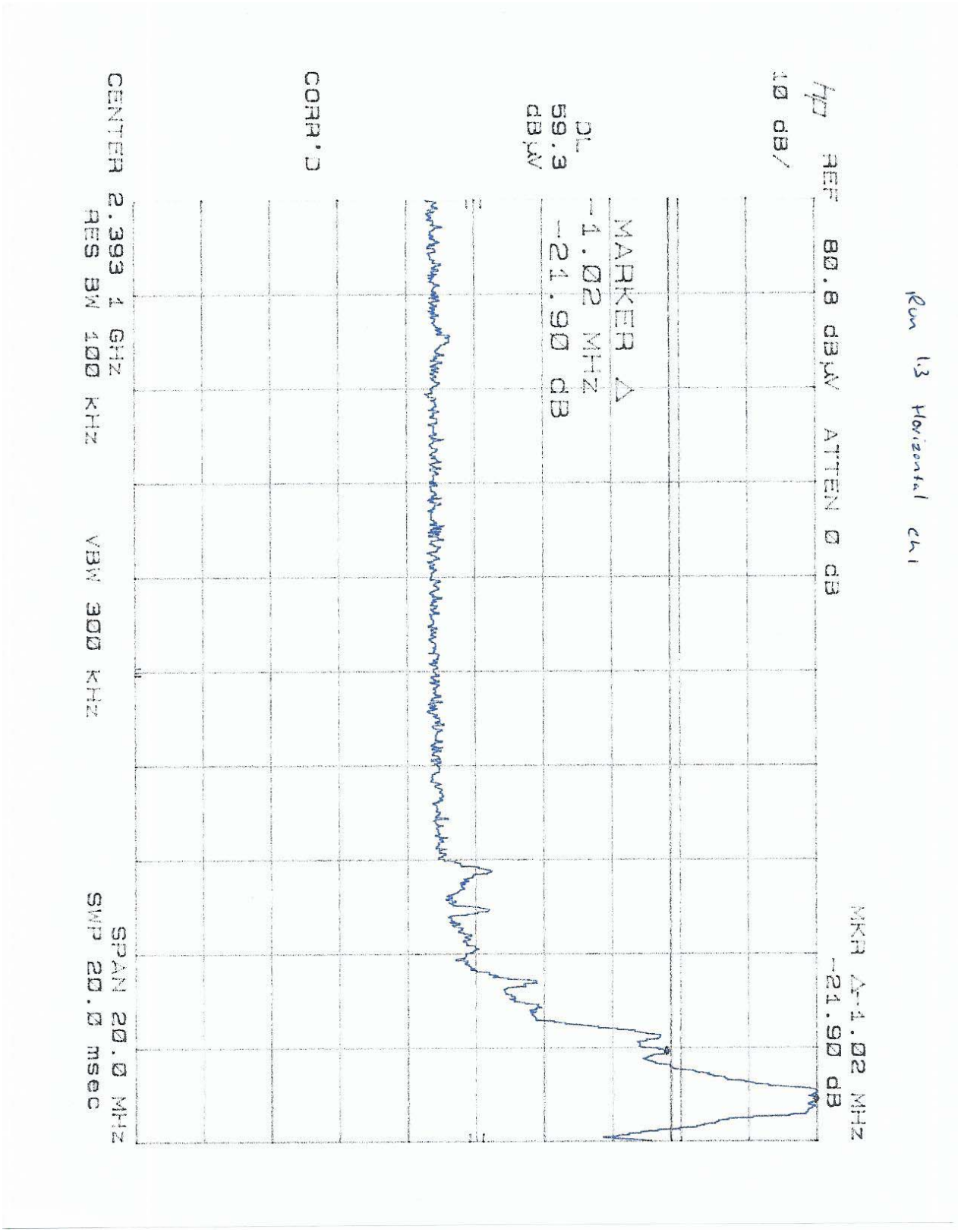
2.6.1 Run 1.2 Ch 79 (Vertical Plot)



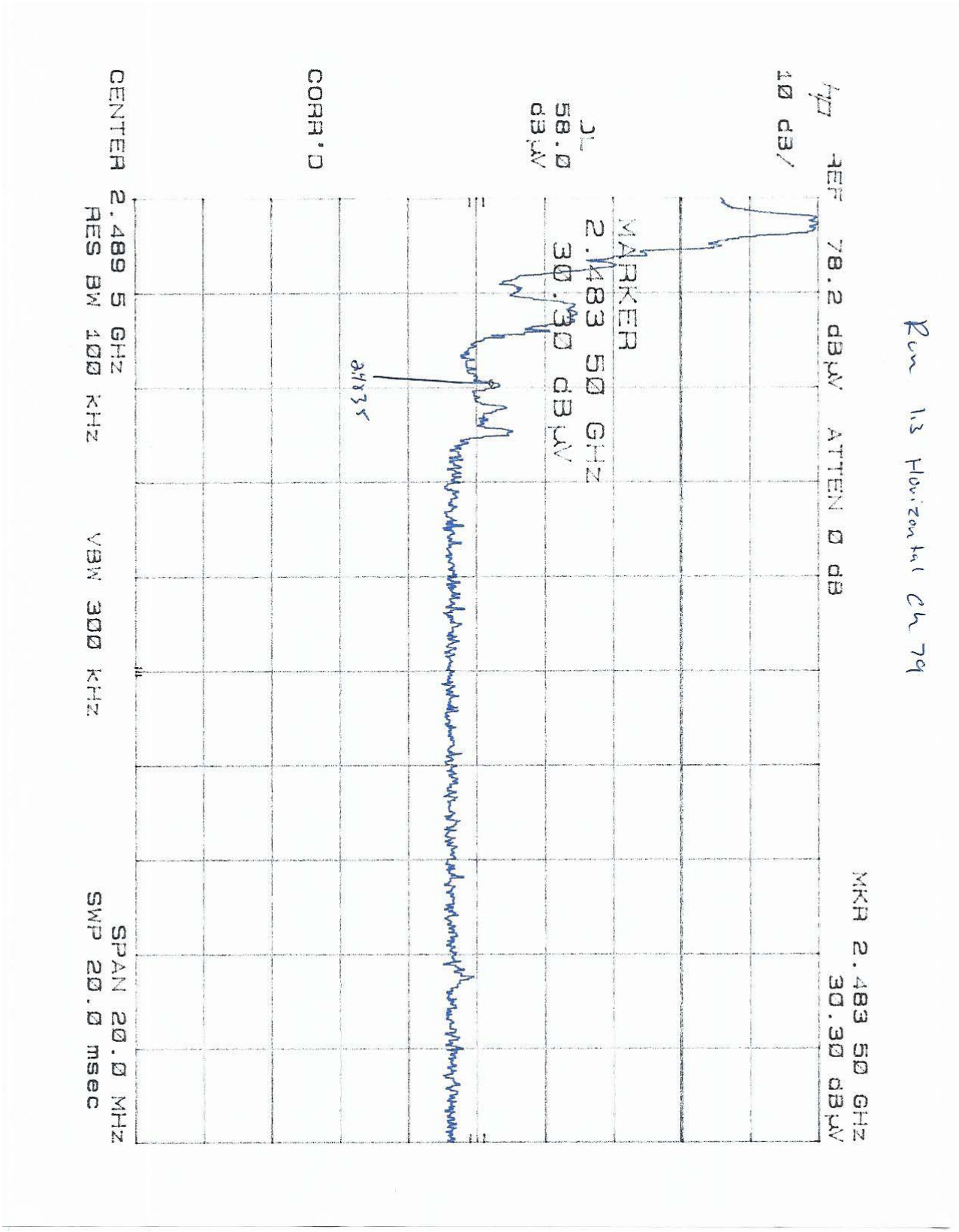
2.6.2 Run 1.2 Channel 1 (Vertical Plot)



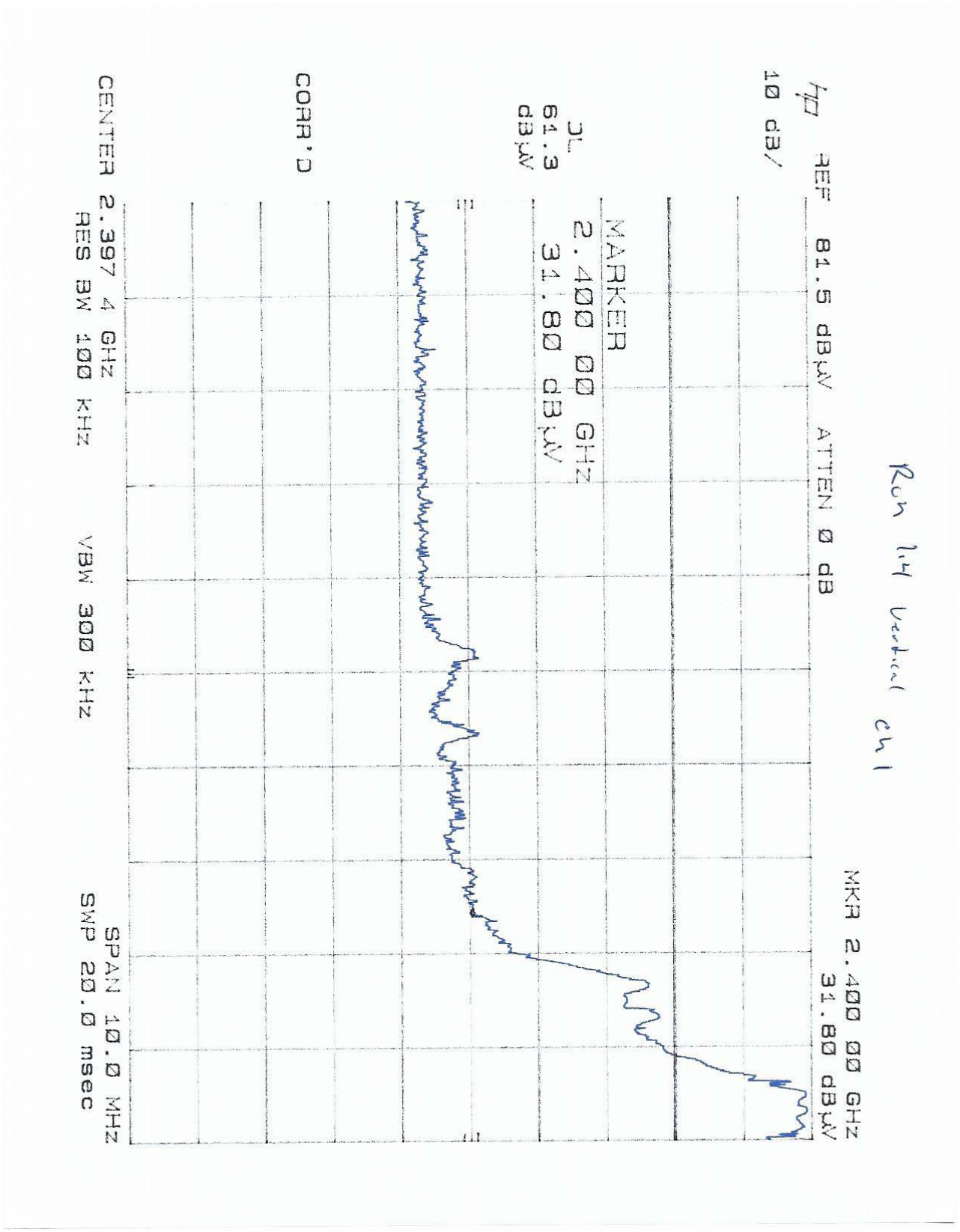
2.6.3 Run 1.3 (Ch 1 Horizontal Plot)



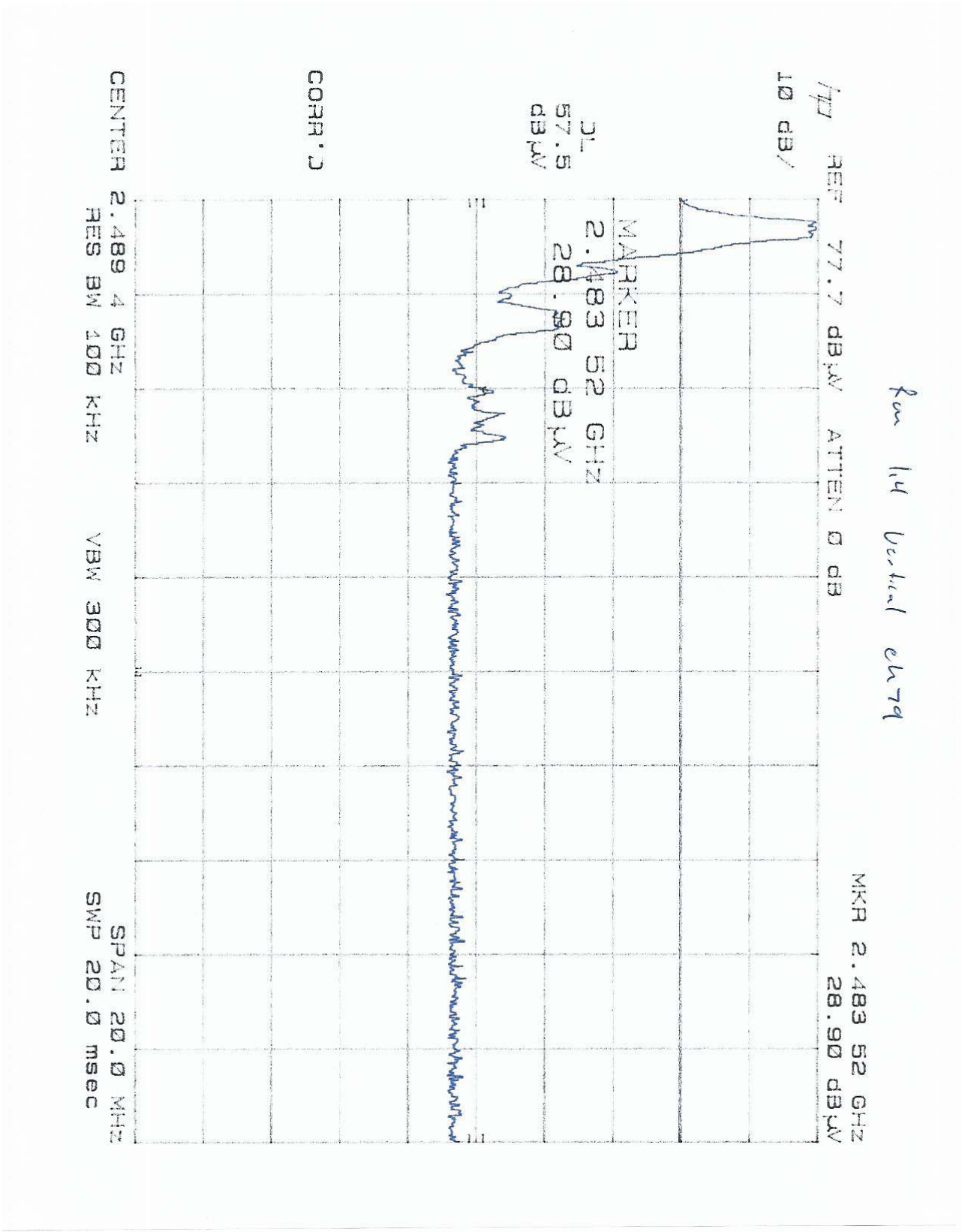
2.6.4 Run 1.3 (Ch 79 Horizontal Plot)



2.6.5 Run 1.4 (Ch 1 Vertical Plot)



2.6.6 Run 1.4 (Ch 79 Vertical Plot)



2.7 Climatic Conditions

The climatic conditions during the Radiated Emissions tests were recorded as follows:

Ambient Temperature	Measured Value
Temperature	19C
Relative Humidity	43%

2.8 Compliant Statement

The EUT was compliant with 47 CFR Part 15, Subpart C, Section 15.247,

YES	NO
CA	

CA Test Engineer's Initials

2.9 Radiated Emissions Compliance Data

See Appendix A for Attachment Information

2.10 Photograph of Radiated Emissions Test Setup

EUT: VMX-100
View: Test Setup

See Appendix A for Attachment Information

3 EQUIPMENT MANUFACTURED AFTER COMPLIANCE TESTING

It is prudent that manufacturers have an established Quality Assurance program to spot-check their products on a periodic basis, either based upon time or quantities produced. Obviously, a change in the engineering design should be sufficient justification for a re-test.

The Quality Assurance test need not be formal Verification or Certification such as required during the initial production of the product. However, it should be sufficient in scope to assure that the EMI characteristics of the product have not changed to the degree that the product exceeds the FCC limits. If a new model of a product is produced, it must undergo full Verification or Certification testing and, in case of Certification, be filed with the FCC.

It is expected that the FCC will place greater emphasis and resources in spot-checking commercially available products. If a product is found not to be compliant with the Limits specified in Part 15, Subpart B. the manufacturer will be subject to the appropriate penalties imposed by the Commission. The initial Certification or Verification is sufficient to justify initial production. The additional quality assurance testing performed is the manufacturer's responsibility to assure continued compliance.

4 APPENDIX SECTION

4.1 Appendix A List of Attachments

4.1.1 Attachment A Block Diagram

4.1.2 Attachment B Internal Photographs

4.1.3 Attachment C External Photographs

4.1.4 Attachment D Test Data

4.1.5 Attachment E Test Setup Photographs

4.1.6 Attachment F Schematic

4.1.7 Attachment G Equipment Description

4.1.8 Attachment H Equipment Manual

4.1.9 Attachment I Label Location

4.2 APPENDIX B: UNCERTAINTY TOLERANCE

DNB Engineering's Utah Facility is within acceptable uncertainty tolerances per ANSI C63.4 sections 5.4.6.1 and 5.4.6.2 as well as CISPR 16-1 Annex M, section M.2.

ANSI C63.4

5.4.6.1 Site Attenuation. A measurement site shall be considered acceptable for radiated electromagnetic field measurements if the horizontal and vertical NSA derived from measurements, i.e., the "measured NSA," are within ±4 dB of the theoretical NSA (5.4.6.3) for an ideal site.

5.4.6.1 NSA Tolerance. The ±4 dB tolerance in 5.4.6.1 includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies. These errors are analyzed in ANSI C63.6- [3], wherein it is shown that the performance of a well-built site contributes only 1 dB of the total allowable tolerance.

CISPR 16-1

M.2 Error analysis

. . . The total estimated errors are the basis for the ±4 dB site acceptability criterion consisting of approximately 3 dB measurement uncertainty and an additional allowable 1 dB for site imperfections.

4.3 APPENDIX C: SITE CHARACTERISTICS CHALK CREEK EMI TEST SITE

The DNB Engineering test facility is located in Chalk Creek Canyon near Coalville, Utah. Site characteristics were measured according to the procedures outlined in ANSI C63.4 "Characteristics of Open Field Test Site". The results of these characterizations indicate that the Chalk Creek site is an outstanding facility to perform accurate and repeatable EMI tests.

4.4 Ambient Emissions

Ambient Emission measurements were made to determine the level of the ambient emanations at the DNB test facility. The results indicate that all ambient signals are below the FCC Radiated Emission limits or that each can easily be identified as an ambient signal.

4.5 FCC Certification

FEDERAL COMMUNICATIONS COMMISSION
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

May 14, 2002

Registration Number: 90532

DNB Engineering, Inc.
1100 E. Chalk Creek Rd.
Coalville, UT 84017

Attention: Bryan Broaddus

Re: Measurement facility located at Chalk Creek
3, 10 & 30 meter sites
Date of Listing: May 14, 2002

Gentlemen:

Your request for registration of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC rules. The information has, therefore, been placed on file and the name of your organization added to the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Thomas W Phillips
Electronics Engineer

4.6 NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation

ISO/IEC 17025:1999
ISO 9002:1994

DNB ENGINEERING, INC.
COALVILLE, UT

is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

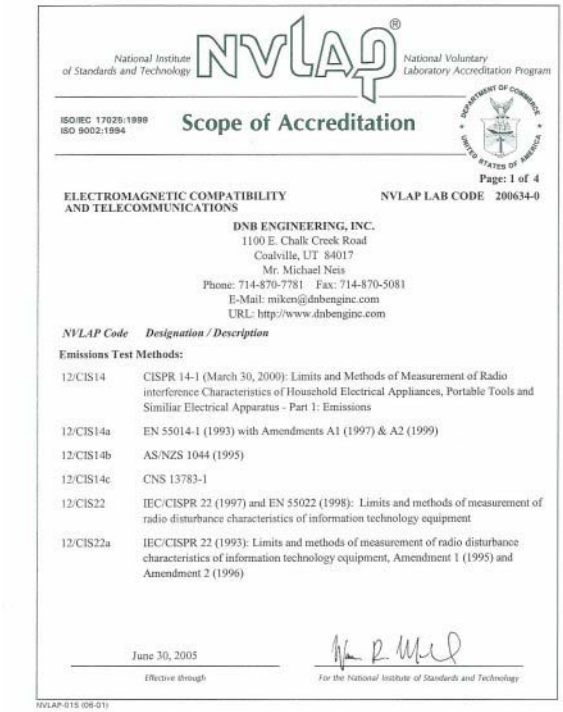
June 30, 2005
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 200634-0

UNITED STATES OF AMERICA ★ DEPARTMENT OF COMMERCE ★

NVLAP-01C (06-01)

4.6.1 NVLAP Accreditation



National Institute of Standards and Technology NVLAP National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

Page: 1 of 4

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS **NVLAP LAB CODE 200634-0**

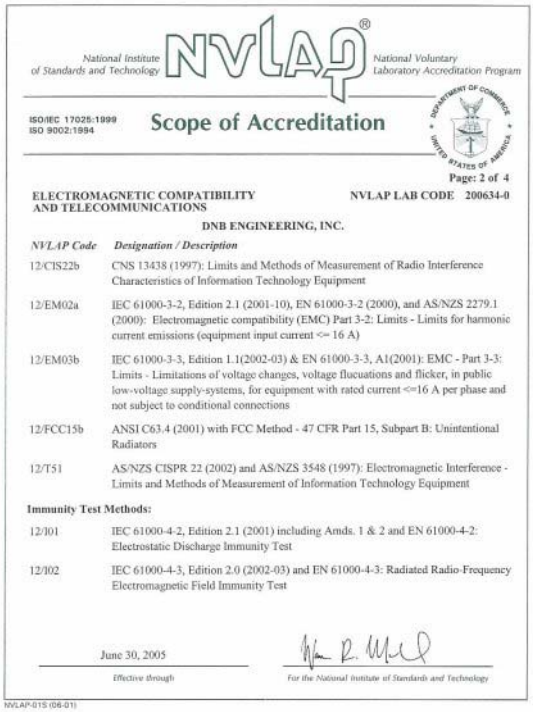
DNB ENGINEERING, INC.
1100 E. Chalk Creek Road
Coalville, UT 84017
Mr. Michael Neis
Phone: 714-870-7781 Fax: 714-870-5081
E-Mail: miken@dnbenginc.com
URL: http://www.dnbenginc.com

NVLAP Code	*Designation / Description*
Emissions Test Methods:	
12/CIS14	CISPR 14-1 (March 30, 2000): Limits and Methods of Measurement of Radio interference Characteristics of Household Electrical Appliances, Portable Tools and Similiar Electrical Apparatus - Part 1: Emissions
12/CIS14a	EN 55014-1 (1993) with Amendments A1 (1997) & A2 (1999)
12/CIS14b	AS/NZS 1044 (1995)
12/CIS14c	CNS 13783-1
12/CIS22	IEC/CISPR 22 (1997) and EN 55022 (1998): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)

June 30, 2005
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)



National Institute of Standards and Technology NVLAP National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

Page: 2 of 4

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS **NVLAP LAB CODE 200634-0**

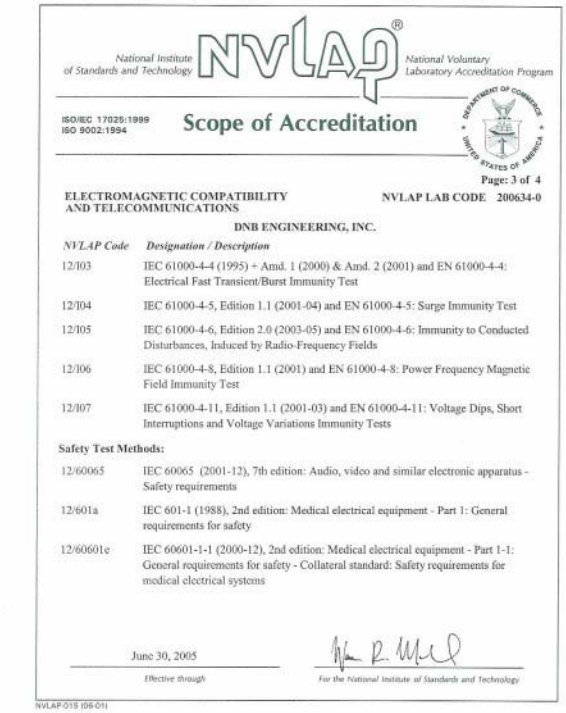
DNB ENGINEERING, INC.

NVLAP Code	*Designation / Description*
12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/EM02a	IEC 61000-3-2, Edition 2.1 (2001-10), EN 61000-3-2 (2000), and AS/NZS 2279.1 (2000): Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A)
12/EM03b	IEC 61000-3-3, Edition 1.1(2002-03) & EN 61000-3-3, A1(2001): EMC - Part 3-3: Limits - Limitations of voltage changes, voltage fluctuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional connections
12/FCC15b	ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart B: Unintentional Radiators
12/T51	AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment
Immunity Test Methods:	
12/I01	IEC 61000-4-2, Edition 2.1 (2001) including Amds. 1 & 2 and EN 61000-4-2: Electrostatic Discharge Immunity Test
12/I02	IEC 61000-4-3, Edition 2.0 (2002-03) and EN 61000-4-3: Radiated Radio-Frequency Electromagnetic Field Immunity Test

June 30, 2005
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)



National Institute of Standards and Technology NVLAP National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

Page: 3 of 4

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS **NVLAP LAB CODE 200634-0**

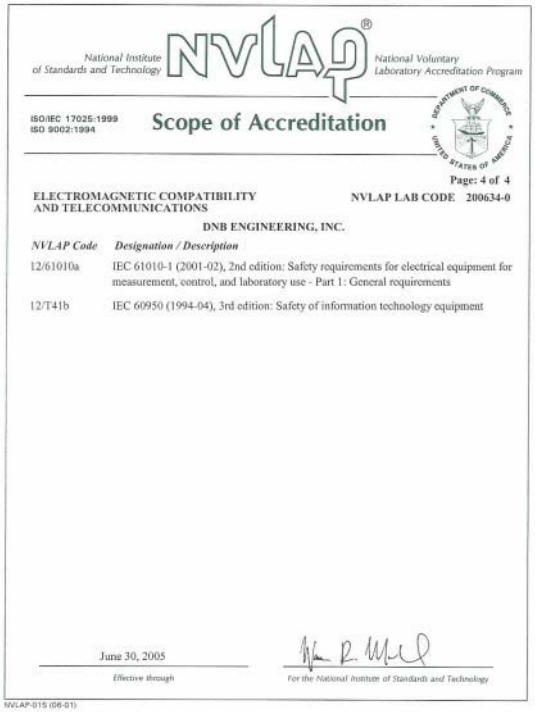
DNB ENGINEERING, INC.

NVLAP Code	*Designation / Description*
12/I03	IEC 61000-4-4 (1995) + Amd. 1 (2000) & Amd. 2 (2001) and EN 61000-4-4: Electrical Fast Transient/Burst Immunity Test
12/I04	IEC 61000-4-5, Edition 1.1 (2001-04) and EN 61000-4-5: Surge Immunity Test
12/I05	IEC 61000-4-6, Edition 2.0 (2003-05) and EN 61000-4-6: Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields
12/I06	IEC 61000-4-8, Edition 1.1 (2001) and EN 61000-4-8: Power Frequency Magnetic Field Immunity Test
12/I07	IEC 61000-4-11, Edition 1.1 (2001-03) and EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
Safety Test Methods:	
12/60065	IEC 60065 (2001-12), 7th edition: Audio, video and similar electronic apparatus - Safety requirements
12/601a	IEC 601-1 (1988), 2nd edition: Medical electrical equipment - Part 1: General requirements for safety
12/60601e	IEC 60601-1-1 (2000-12), 2nd edition: Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems

June 30, 2005
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)



National Institute of Standards and Technology NVLAP National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

Page: 4 of 4

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS **NVLAP LAB CODE 200634-0**

DNB ENGINEERING, INC.

NVLAP Code	*Designation / Description*
12/61010a	IEC 61010-1 (2001-02), 2nd edition: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
12/T41b	IEC 60950 (1994-04), 3rd edition: Safety of information technology equipment

June 30, 2005
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

4.7 Nemko Accreditation

Nemko

EMC Laboratory Authorisation

Aut. No.: ELA 116

EMC Laboratory: **DNB Engineering, Inc.**
1100 E. Chalk Creek Rd.
Coalville, UT 84017
USA

Scope of Authorization: **All CENELEC standards [ENs] for EMC that are listed on the accompanying page, and, all of the corresponding CISPR, IEC, and ISO EMC standards that are listed on the accompanying page.**

Nemko has assessed the testing facilities, qualifications and testing practices and the relevant part of the organization. The above-mentioned EMC Laboratory has been validated against EN 45001 and ISO 17025 and found to be compliant. The laboratory also fulfils the conditions described in Nemko Document ELA-INFO-10. During Nemko's visit it was found that the EMC Laboratory is capable of performing tests within the Scope of Authorisation given on the accompanying page(s).

Accordingly, Nemko will accept test reports from the laboratory as a basis for attesting conformity to these EMC Standards under either the European Union EMC Directive (89/336/EEC) or, when applicable, the national standards of countries Nemko has been authorised to attest conformity with.

In order to maintain the Authorisation, the information given in the pertinent ELA-INFO-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the EMC Laboratory, which may affect the basis for this Authorisation. The Authorisation may be withdrawn at any time if the conditions are no longer considered to be fulfilled.

The Authorisation is valid through 31 December 2004.

Oslo, 12. November 2002

For Nemko AS:

Kjell Bergh

Kjell Bergh, Nemko Group EMC Co-ordinator

ELA 4-EMC ED1-2002

Nemko AS Gaustadalléen 30 P.O Box 73 Blindern N-0314 Oslo Norway T +47 22 96 03 30 F +47 22 96 05 50 Enterprise number NO974404532

4.8 APPENDIX D EMC INSTRUMENTATION AND MEASUREMENT EQUIPMENT

Calibration of test and measurement equipment is performed by an approved commercial facility, whose standards are traceable to the National Institute of Science and Technology.

Radiated Emissions

Description	Manufacturer/MN	Asset #	Serial #	Cal Due
Amplifier	HP/8447D	U-067	2727A06182	23MAR05
Amplifier	HP/8447D	U-065	2727A06180	23MAR05
Amplifier	HP/8447D	U-066	2727A06181	23MAR05
Amplifier	HP/8447D	U-068	2727A06184	23MAR05
Bicon Antenna	SCH/BBA9106	U-187	6	20AUG05
Bicon Antenna	SCH/BBA9106	U-186	7	26JUN05
Log P Antenna	SCH/UJALP9107	U-011	11	26JUN05
Log P Antenna	SCH/UHAL09107	U-010	10	20 AUG05
Loop Antenna	R&S/HFH 2-Z2	U-016	880665/-40	22JUL05
QP Adapter	HP/85650 A	U-001	2043A00277	05NOV04
Receiver	R&S/ESVP	U-078	879807/048	15APR05
Receiver	R&S/ESVP	U-083	882402/005	30JAN05
Spectrum Analyzer	Agilent	U-257	MY 42000103	Reference
Spectrum Analyzer	HP/8566B	U-138	2421A00516	06MAR05

High frequency Equipment

Description	Manufacturer/MN	Asset #	Serial #	Cal Due
Amplifier 1-20 GHz	Miteq/AFS6-02002000 18-P-MP	U-162	428738	30MAR05
Horn Antenna, Double Rdg GD	AH Systems/SAS-200/571	U-071	222	17JUN05
Rigid Coax	Pasternack/PE3828-24	U-004	CC-300-5033	26MAR05
High Frequency Cable 1-20 GHz	Andrew/FSJ1-50A	U-323	58051	26MAR05

End of Report 56015-1