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

LOW POWER TRANSMITTER CERTIFICATION REPORT

Per

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

EUT: WIDEBAND MODEL A

PREPARED FOR APPLICANT:
Integral Systems Design, LLC
946 East 880 North
Orem, UT. 84097

Nemko
ELA #116
NVLAP
NVLAP Lab Code 200634-0

REPORT # 66114
Test Completion Date: August 7, 2006

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 WIDEBAND MODEL A, 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	11/14/2006

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TRANSMITTAL SUMMARY

Unit tested:	WIDEBAND MODEL A
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 rad-ID, 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:	WIDEBAND MODEL A
Test Completion Date:	August 7, 2006

Report Written By:

November 14, 2006

Carrie Yates — Date
Quality Assurance Manager

Report Reviewed By:

November 14, 2006

Clay Allred — Date
Lab Manager

1 INTRODUCTION

1.1 Administrative Data and Test Description

Responsible Party:	**Integrel System Design, LLC (ISD)**
	946 East 880 North
	Orem, UT. 84097
Contact:	Phil Bunker
Phone:	801-368-9262
Test Completion Date:	August 7, 2006
Equipment Under Test:	WIDEBAND MODEL A
FCC ID:	**UERwide2480**

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	Input (V)	Comments / FCC ID#
1	Wideband Transmitter	Model A		X	6VDC	UERwide2480

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

1.3 Equipment Description

The IWS Wireless Data Acquisition Module (WDAM) is a wireless datagram transport device designed for harvesting data from a Wireless Data Acquisition Network (WDAN) cell on a configurable, periodic basis. In addition, alarm set points may also trigger a pre-mature communication from a sensor node.

1.4 Mode of Operation

The Equipment under test was set to continuous transmit mode. With transmit antenna in the vertical position.

1.5 Documented EMC Control Measures

Reduced power output of the transmitter, and added filter network to reduce harmonic emissions.

1.6 Clock Frequencies

13.824MHz Crystal and a Transmit Frequency of 2.474 GHz – 2.482GHz

1.7 Test Voltage

6 VDC

1.8 Justifications

None

1.9 Antenna Information

See Appendix A for Attachment Information

1.10 Block Diagram / Schematics

See Appendix A for Attachment Information

1.11 Internal Photograph Equipment under Test (EUT)

EUT: WIDEBAND MODEL A
View: EUT

See Appendix A for Attachment Information

1.12 External Photograph Equipment under Test (EUT)

EUT: WIDEBAND MODEL A
View: EUT

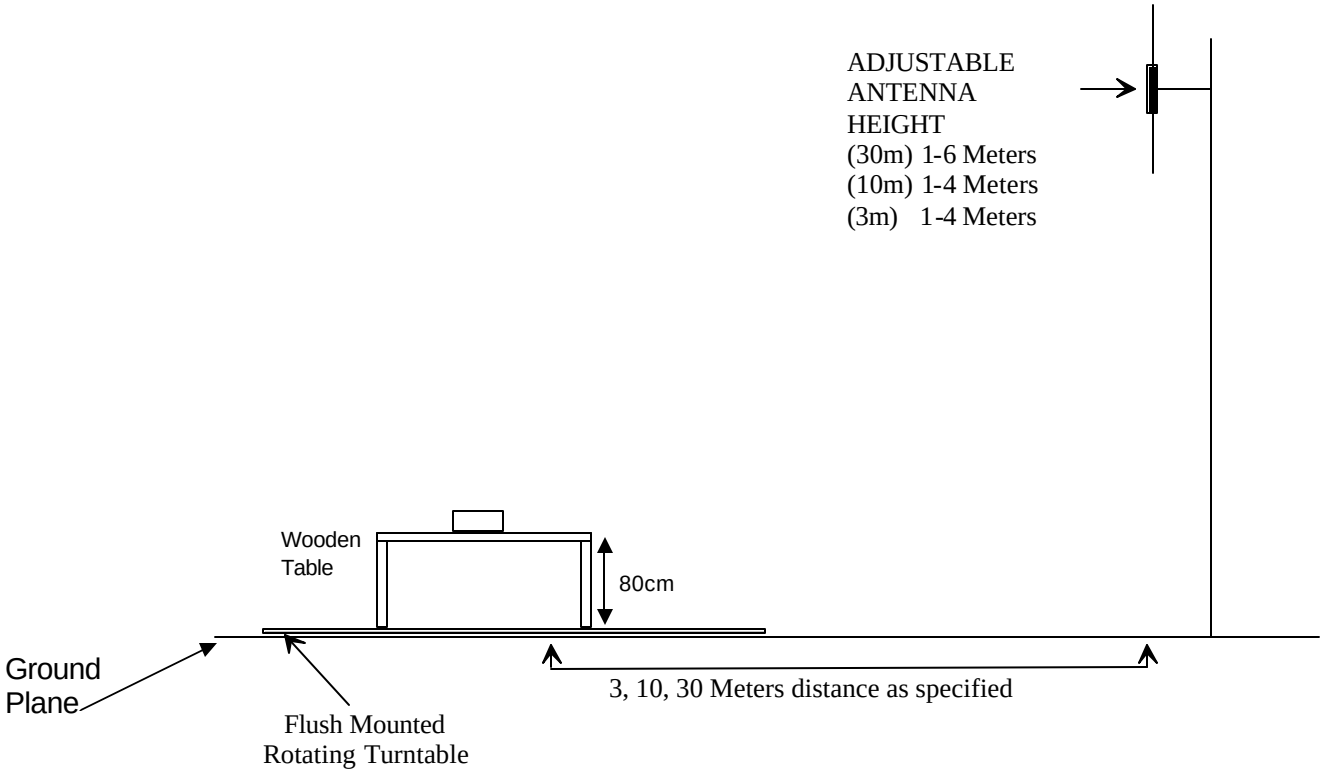
See Appendix A for Attachment Information

2 RADIATED EMISSIONS PER PART 15, SUBPART C, SECTION 15.247

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

Upper Transmit Frequency (2.482GHz) 30-1000MHz Spurious

ISD	EUT: WIDEBAND MODEL A

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
290.300	37.4	25.6	5.6	19.5	-0.5	36.90	46.0	-9.10	316	1	Vert	QP
620.417	33.5	27.3	8.2	21.2	2.1	35.60	46.0	-10.40	235	1	Vert	QP
585.781	31.9	27.3	7.9	20.6	1.2	33.10	46.0	-12.90	360	1	Vert	QP
290.300	30.6	25.6	5.6	20.1	0.1	30.70	46.0	-15.30	135	3	Hor/	QP
84.930	37.9	26.3	2.6	7.9	-15.8	22.10	40.0	-17.90	178	1	Vert	QP
152.060	30.1	25.9	3.7	14.7	-7.5	22.60	43.5	-20.90	108	1	Vert	QP

Upper Transmit Frequency (2.482GHz) Above 1GHz Unintentional Emissions

ISD	EUT: WIDEBAND MODEL A

Freq (MHz)	Meas'd (dBuV)	Duty Cycle (dB)	Crrct (dBuV)	Filter & Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit dBuV/m	Delta (dB)	Table (deg)	Height (m)	Hor Vert	Meas. Type Ave, PK
7447.48	64.0	20.0	44.0	27.2	8.9	37.1	18.7	62.7	63.5	-0.8	0	1	Vert	Peak
4963.700	67.5	20.0	47.5	27.6	6.7	35.5	14.6	62.1	63.5	-1.4	37	1	Vert	Peak
7445.500	62.3	20.0	42.3	27.2	8.9	37.1	18.7	61.0	63.5	-2.5	6	1	Hor	Peak
12409.500	50.6	20.0	30.6	24.6	11.7	40.9	27.9	58.5	63.5	-5.0	265	1	Vert	Peak
12409.340	49.4	20.0	29.4	24.6	11.7	40.9	27.9	57.3	63.5	-6.2	338	1	Hor	Peak
4964.000	62.4	20.0	42.4	27.6	6.7	35.5	14.6	57.0	63.5	-6.5	0	1	Hor	Peak
9928.060	47.6	20.0	27.6	26.4	9.8	38.3	21.8	49.4	63.5	-14.1	349	1	Vert	Peak

Lower Transmit Frequency (2.4744GHz) 30-1000MHz Spurious

ISD	EUT: WIDEBAND MODEL A

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
290.297	38.6	25.6	5.6	19.5	-0.5	38.10	46.0	-7.90	290	1	Vert	QP
618.683	35.3	27.3	8.2	21.2	2.1	37.40	46.0	-8.60	255	1	Vert	QP
594.425	34.5	27.3	8.0	20.7	1.4	35.90	46.0	-10.10	294	1	Vert	QP
580.599	33.7	27.3	7.9	20.5	1.1	34.80	46.0	-11.20	245	1	Vert	QP
290.300	30.9	25.6	5.6	20.1	0.1	31.00	46.0	-15.00	128	3.25	Hor/	QP
85.519	37.8	26.3	2.6	8.1	-15.6	22.20	40.0	-17.80	155	1	Vert	QP

Lower Transmit Frequency (2.4744GHz) Above 1GHz Unintentional Emissions

ISD	EUT: WIDEBAND MODEL A

Freq (MHz)	Meas'd (dBuV)	Duty Cycle (dB)	Crrct (dBuV)	Filter & Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit dBuV/m	Delta (dB)	Table (deg)	Height (m)	Hor Vert	Meas. Type Ave, PK
7424.40	64.2	20.0	44.2	27.3	8.9	37.0	18.7	62.9	63.5	-0.6	360	1	Vert	Peak
4948.500	67.9	20.0	47.9	27.6	6.7	35.4	14.5	62.4	63.5	-1.1	74	1	Vert	Peak
7422.480	63.4	20.0	43.4	27.3	8.9	37.0	18.7	62.1	63.5	-1.4	5	1	Hor	Peak
12374.850	49.6	20.0	29.6	24.6	11.7	40.8	27.9	57.5	63.5	-6.0	42	1	Hor	Peak
4949.100	62.5	20.0	42.5	27.6	6.7	35.4	14.5	57.0	63.5	-6.5	244	1	Hor	Peak
12370.120	47.9	20.0	27.9	24.6	11.6	40.8	27.9	55.8	63.5	-7.7	203	1	Vert	Peak
14848.060	43.2	20.0	23.2	22.4	14.2	40.7	32.5	55.7	63.5	-7.8	312	1	Vert	Peak
9896.860	44.6	20.0	24.6	26.4	9.9	38.3	21.7	46.3	63.5	-17.2	297	1	Vert	Peak

- 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

Upper Transmit Frequency (2.482GHz) Fundamental Frequency

ISD	EUT: WIDEBAND MODEL A

Freq (MHz)	Meas'd (dBuV)	Duty Cycle (dB)	Crrct (dBuV)	Filter & Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit dBuV/m	Delta (dB)	Table (deg)	Height (m)	Hor Vert	Meas. Type Ave, PK
2482.50	96.2	20.0	76.2	-10.2	4.1	29.2	43.4	119.6	137.0	-17.4	75	1	Vert	Peak
2428.600	84.4	20.0	64.4	-10.6	4.0	29.1	43.7	108.1	137.0	-28.9	66	1	Hor	Peak

Lower Transmit Frequency (2.4744GHz) Fundamental Frequency

ISD	EUT: WIDEBAND MODEL A

Freq (MHz)	Meas'd (dBuV)	Duty Cycle (dB)	Crrct (dBuV)	Filter & Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit dBuV/m	Delta (dB)	Table (deg)	Height (m)	Hor Vert	Meas. Type Ave, PK
2474.00	95.2	20.0	75.2	-10.2	4.1	29.2	43.4	118.6	137.0	-18.4	85	1	Vert	Peak
2474.800	83.0	20.0	63.0	-10.2	4.1	29.2	43.4	106.4	137.0	-30.6	60	1	Hor	Peak

2.4 Climatic Conditions

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

Ambient Temperature	Measured Value
Temperature	19C
Relative Humidity	43%

2.5 Compliant Statement

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

YES	NO
CA	

CA Test Engineer's Initials

2.6 Radiated Emissions Compliance Data

See Appendix A for Attachment Information

2.7 Photograph of Radiated Emissions Test Setup

EUT: WIDEBAND MODEL A
View: Test Setup

See Appendix A for Attachment Information

2.8 Bandwidth Compliance Data

6 dB Bandwidth Summary and Test Data
47 CFR Part 15, Subpart C, Section 15.247 (a) (2)

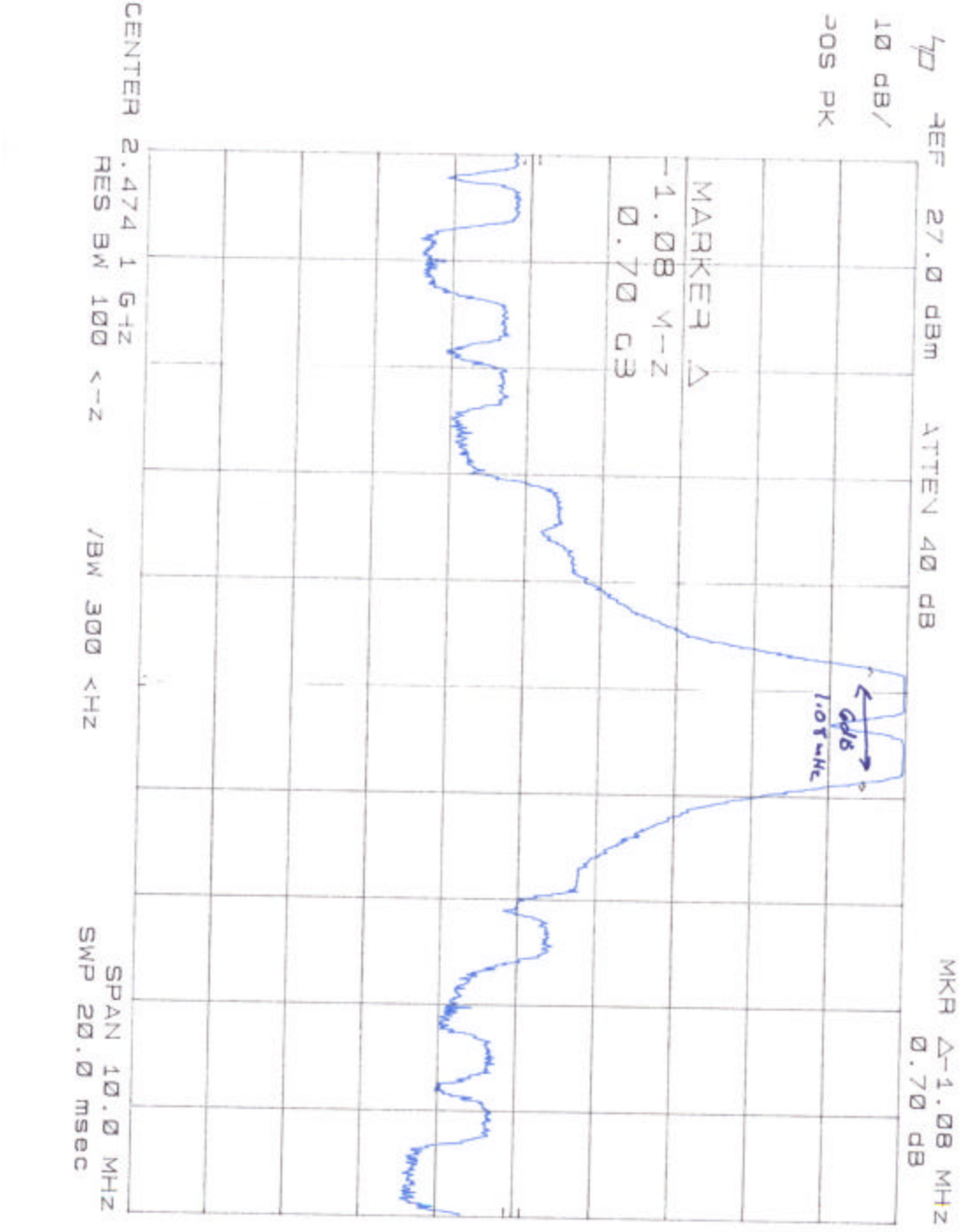
2.8.1 Test Description

The EUT Antenna port was connected to the input of the spectrum analyzer through 2 ft a low loss Rigid Coax cable. The transmitter was turned on in continuous mode at the set output power, and with the applicable modulation applied to the signal. The Spectrum Analyzer Resolution and Video bandwidths were set to the parameters listed below, and each Frequency under investigation was maximized. The Analyzers marker was set to each side of the peak 6 dB below the carrier, and the bandwidth was noted.

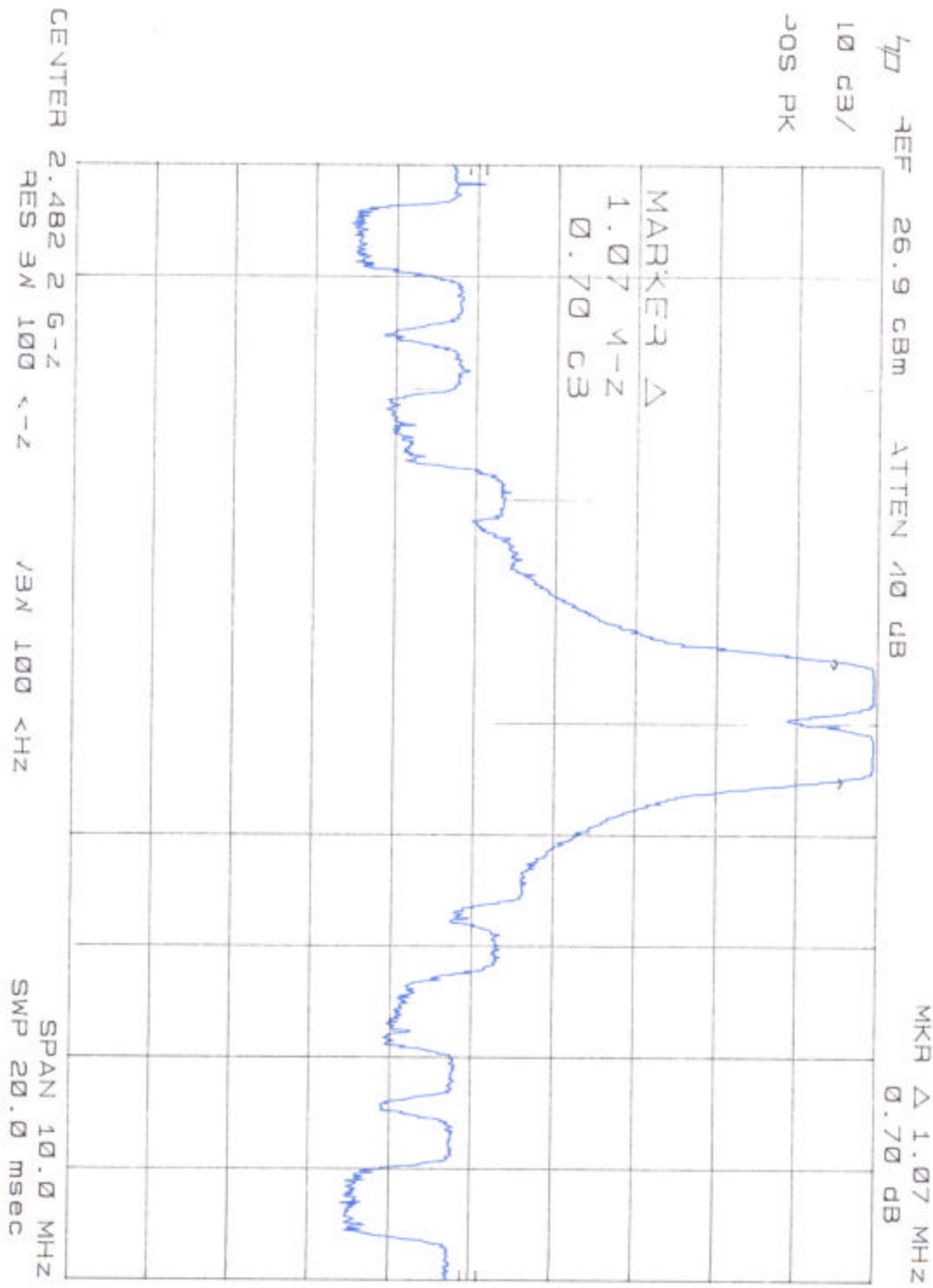
Resolution Bandwidth = 100kHz
Video Bandwidth = 300kHz
Frequency Range under test = 2.4744GHz – 2.482GHz

Frequency (GHz)	6 dB Bandwidth (MHz)
2.4744	**1.08**
2.482	**1.07**

2.8.2 (2.4744 6dB Bandwidth)



2.8.3 (2.482GHz)


6dB
Bandwidth = 1.07MHz
REF 26.9 dBm
ATTEN 10 dB
10 dB/
POS PK
MARKER Δ
1.07 MHz
0.70 dB
CENTER 2.482 2 GHz
RES BW 100 kHz
VBW 100 kHz
SPAN 10.0 MHz
SWP 20.0 msec
MKR Δ 1.07 MHz
0.70 dB

2.9 Out of Band Conducted Emissions

Out of Band Emissions Summary and Test Data
47 CFR Part 15, Subpart C, Section 15.247 (c)

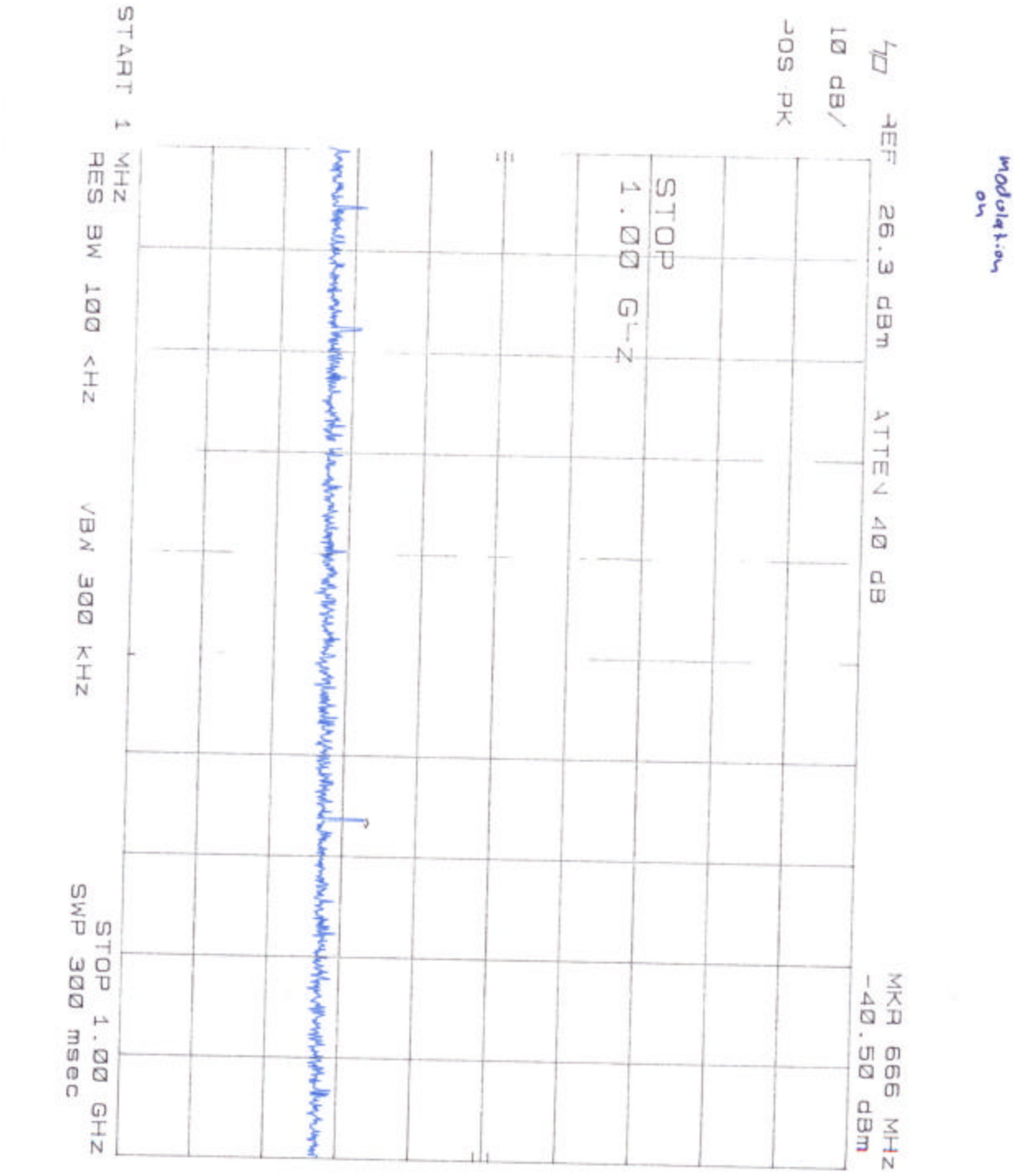
2.9.1 Test Description

The EUT Antenna port was connected to the input of the spectrum analyzer through 2 ft a low loss Rigid Coax cable. The transmitter was turned on in continuous mode at the set output power, and with the applicable modulation applied to the signal. The Spectrum Analyzer Resolution and Video bandwidths were set to the parameters listed below, and the applicable test range was scanned. Any points exceeding 20 dB below the carrier are to be considered a failure, and noted.

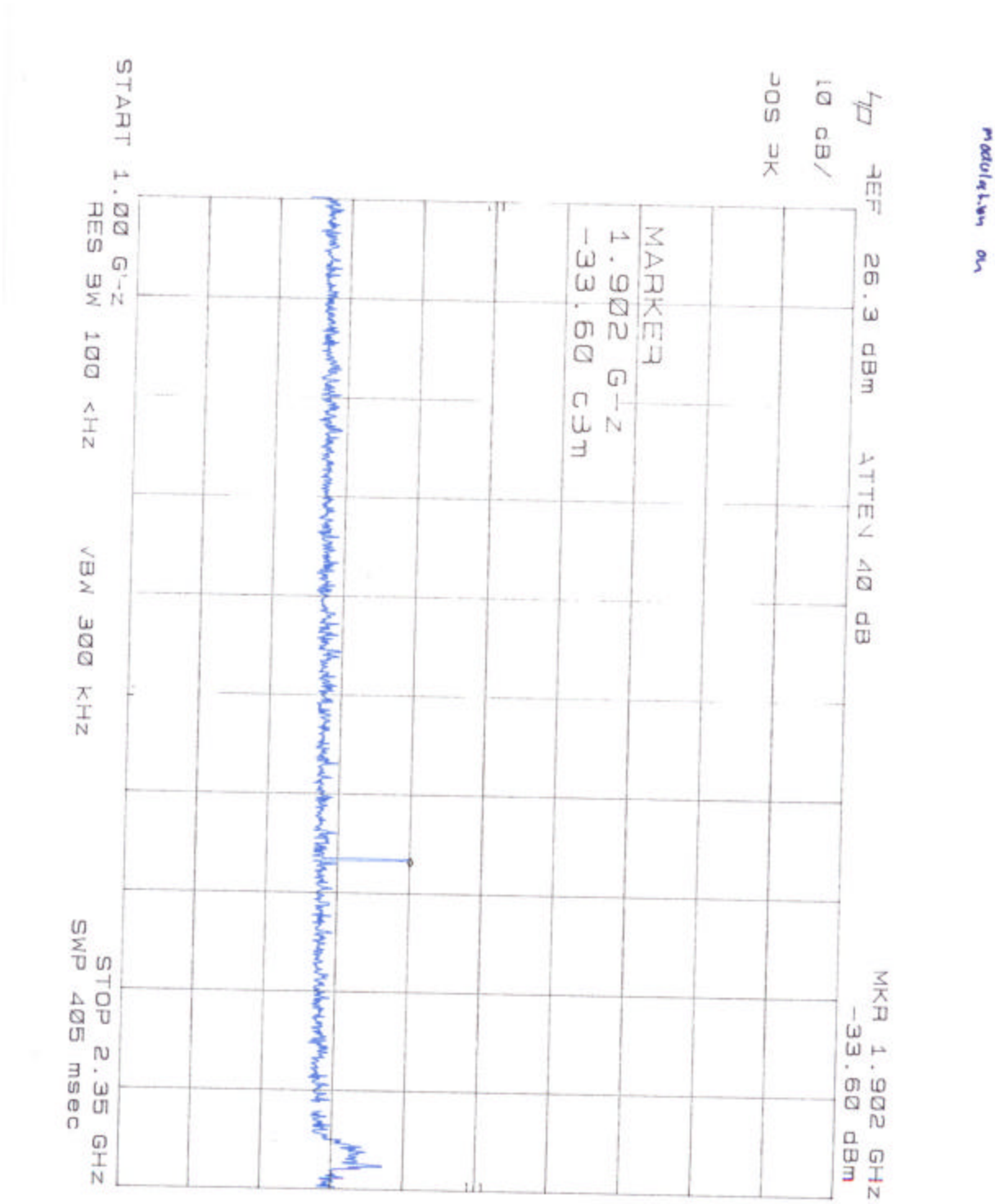
Resolution Bandwidth = 100kHz
Video Bandwidth = 300kHz
Frequency Range under test = 2.4744GHz – 2.482GHz

Refer to following test plots for

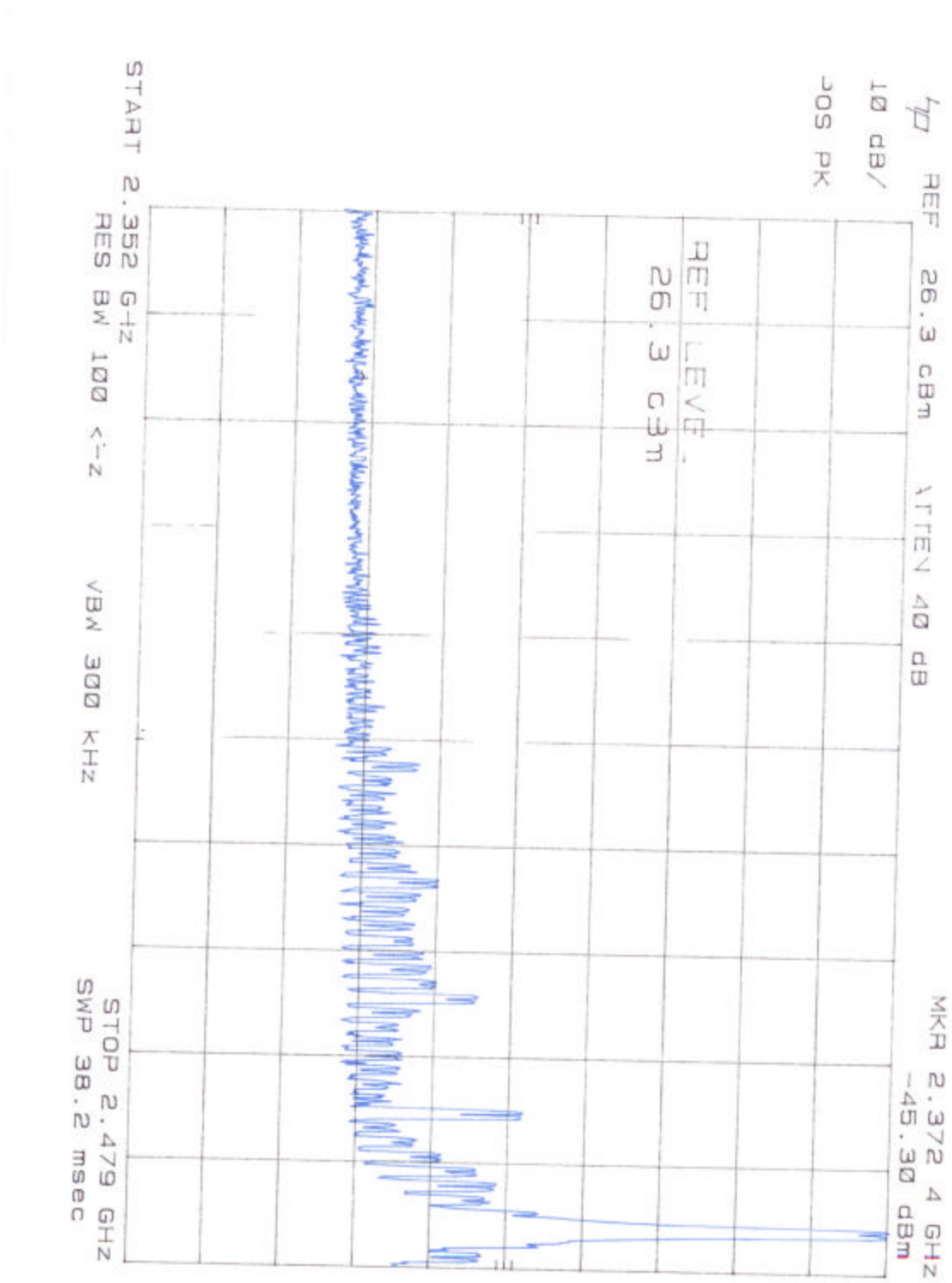
2.9.2 .001-1GHz Test Data (EUT set to 2.744GHz Transmit Frequency)



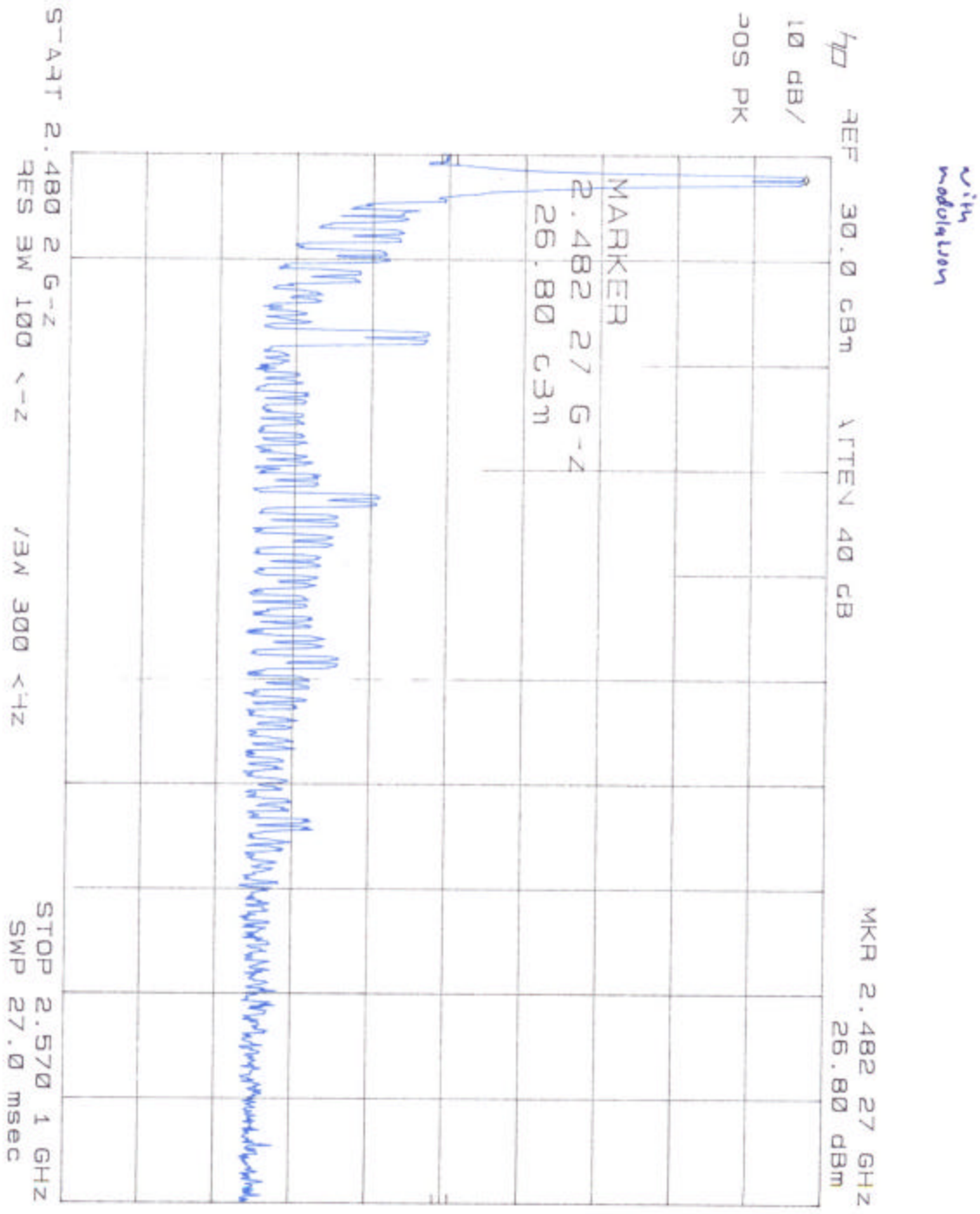
2.9.3 .1 - 2.35GHz Test Data (EUT set to 2.744GHz Transmit Frequency)



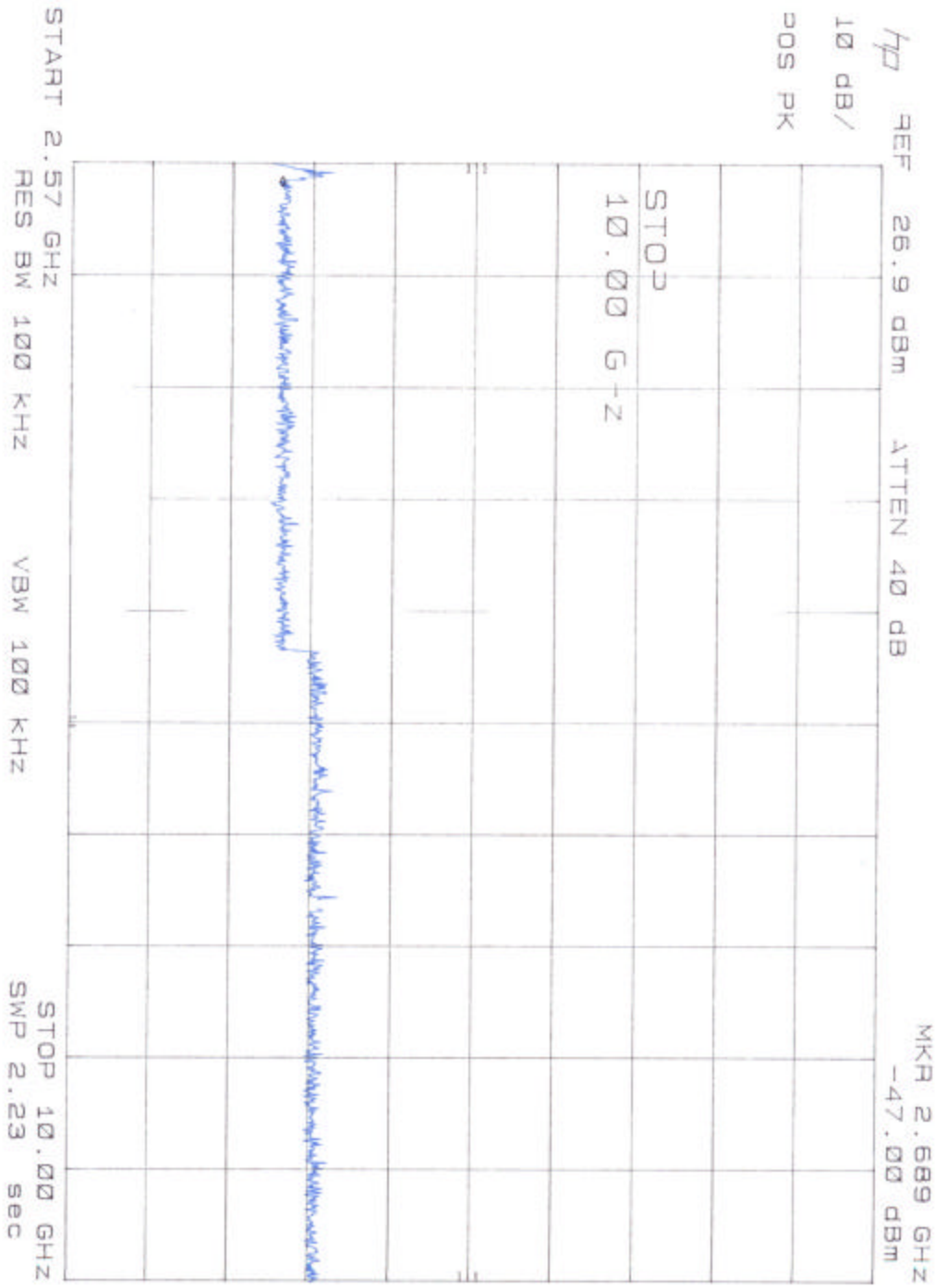
2.9.4 2.35 – 4.79GHz Test Data (EUT set to 2.744GHz Transmit Frequency)



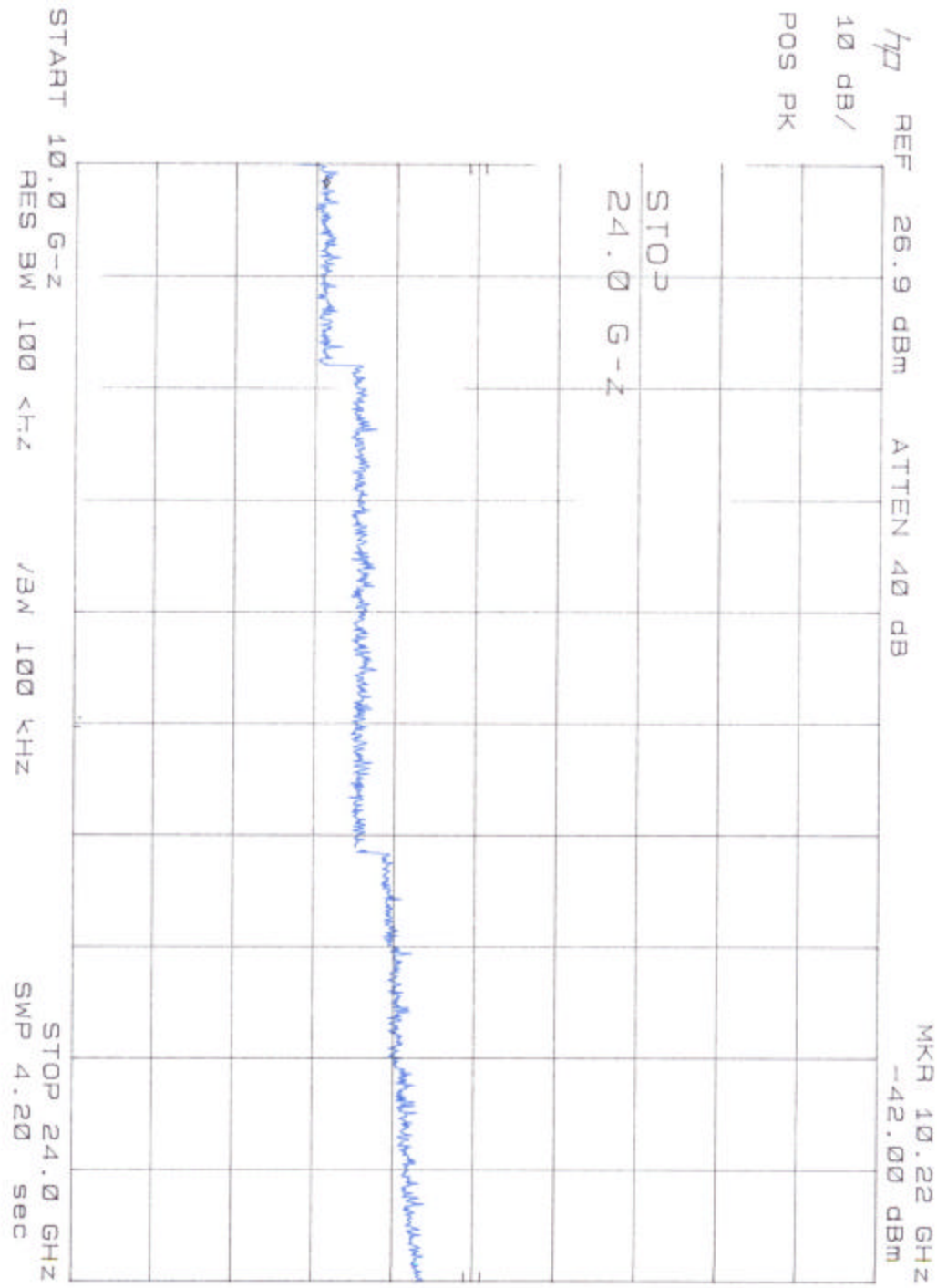
2.9.5 2.48 – 2.57GHz Test Data (EUT set to 2.482GHz Transmit Frequency)



2.9.6 2.57 – 10GHz Test Data (EUT set to 2.482GHz Transmit Frequency)



2.9.7 10 – 24GHz Test Data (EUT set to 2.482GHz Transmit Frequency)



2.10 Duty Cycle Information

Duty Cycle Summary and Test Data
47 CFR Part 15, Subpart C, Section 15.247 (c)

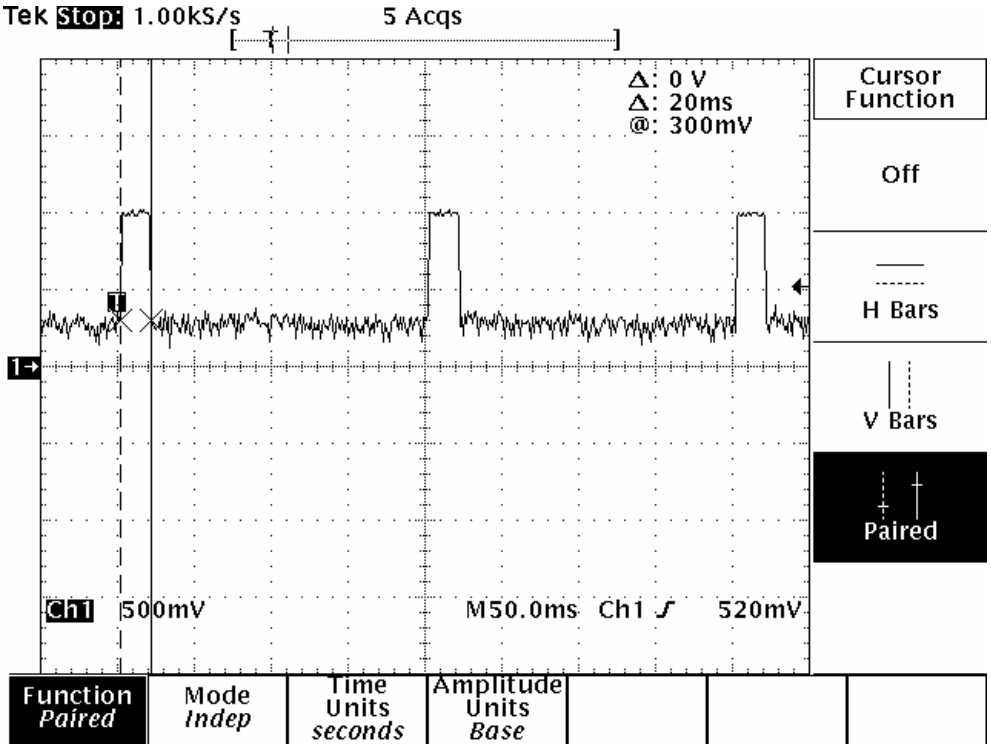
2.10.1 Test Description

The EUT Antenna port was connected to the input of the spectrum analyzer through 2 ft a low loss Rigid Coax cable. The transmitter was turned on in continuous mode at the set output power, and with the applicable modulation applied to the signal. The Spectrum Analyzer was set to 0 Hz span and adjusted to for best resolution. The Video output of the analyzer was connected to a Tektronix TDS 52013 Oscilloscope in order to perform the necessary calculations.

2.10.2 Duty Cycle Calculations

Duty Cycle = PW X (Number of Pulses) / Period

Duty Cycle = 20 ms * 3 (60 ms) / 500 ms. = 12%



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

Attachment A Block Diagram / Schematics
Attachment B Equipment Photographs
Attachment C Radiated Emissions Test Data
Attachment D Test Setup Photographs
Attachment E Equipment Manual
Attachment F Label Information
Attachment G EUT Antenna Information

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.

4.3.1 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.

4.4 NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:1999

NVLAP LAB CODE: 200634-0

DNB Engineering, Inc.
Coalville, UT

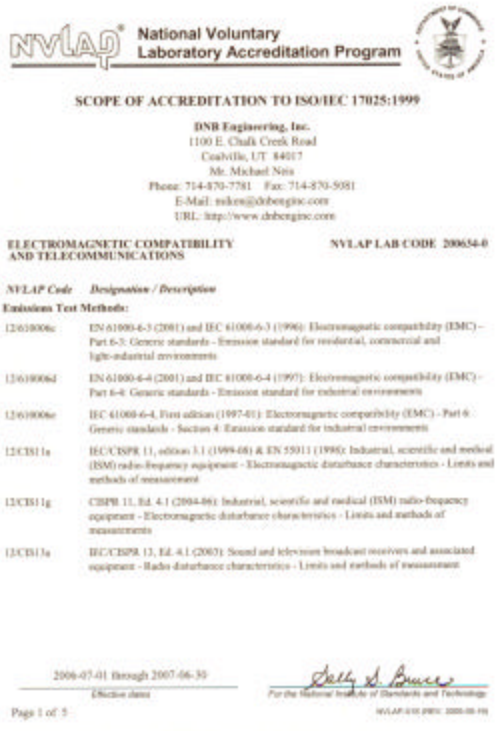
is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in NIST Handbook 150:2001 and all requirements of ISO/IEC 17025:1999.
Accreditation is granted for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

2006-07-01 through 2007-06-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2005-05-19)



NVLAP National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

DNB Engineering, Inc.
1100 E. Chalk Creek Road
Coalville, UT 84017
Mr. Michael Nris
Phone: 714-870-7781 Fax: 714-870-5081
E-Mail: mikes@dnbengine.com
URL: http://www.dnbengine.com

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

NVLAP Code	*Designation / Description*
Emissions Test Methods:	
12/61000c	EN 61000-6-3 (2001) and IEC 61000-6-3 (1996): Electromagnetic compatibility (EMC) – Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
12/61000d	EN 61000-6-4 (2001) and IEC 61000-6-4 (1997): Electromagnetic compatibility (EMC) – Part 6-4: Generic standards - Emission standard for industrial environments
12/61000e	IEC 61000-6-4, First edition (1997-01): Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 4: Emission standard for industrial environments
12/CIS11a	IEC/CISPR 11, edition 3.1 (1999-08) & EN 55011 (1998): Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11g	CISPR 11, Ed. 4.1 (2004-06): Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurements
12/CIS13a	IEC/CISPR 13, Ed. 4.1 (2003): Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement

2006-07-01 through 2007-06-30
Effective dates

For the National Institute of Standards and Technology

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4.4.1 NVLAP Accreditation

National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS — NVLAP LAB CODE 200634-0

NVLAP Code	Designation / Description
12/CB14	CISPR 14-1 (March 30, 2000): Limits and Methods of Measurement of Radio Interference Characteristics of Household Electrical Appliances, Portable Tools and Similar Electrical Apparatus - Part 1: Emissions
12/CB14a	EN 55014-1 (1993), A1 (1997), A2 (1999)
12/CB14b	AS/NZS 1044 (1995)
12/CB14c	CNS 13783-1: Electromagnetic Compatibility Requirements for household appliances, electric tools and similar apparatus - Part 1: Emissions
12/CB14y	IEC/CISPR 14-1, Edition 4.2 (2002-10): Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CS22	IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CS22a	IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)
12/CS22a1	IEC/CISPR 22 (1997) A1(2002); EN55022(1998)A1(2000),A2(2003): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/CS22c	IEC/CISPR 22, Fourth Edition (2003-04) & EN 55022 (1998): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
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)

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NVLAP Code	Designation / Description
12/EM05	IEC 61000-3-3, Edition 1.1(2002-05) & 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 (2003) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators
12/TS1	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/CIS14a	IEC/CISPR 14-2, Edition 1.1 (2001-11): Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard
12/CIS20b	IEC/CISPR 20, 5th Ed. (2002-02): Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurements
12/CIS24d	IEC/CISPR 24 (1997) & EN 55024 (1998) + A1 (2001), A2 (2002): Information technology equipment - Immunity characteristics - Limits and methods of measurements
12/IS1	IEC 61000-4-2, Ed. 1.2 (2001) + A1, A2, EN 61000-4-2: Electrostatic Discharge Immunity Test
12/IS2	IEC 61000-4-3, Ed. 2.0 (2002-03): EN 61000-4-3 (2002): Radiated Radio-Frequency Electromagnetic Field Immunity Test
12/IS2a	IEC 61000-4-3, Ed. 2.1 (2002-09); EN 61000-4-3 (2002): Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
12/IS3	IEC 61000-4-4(1995); A1(2000), A2(2001); EN 61000-4-4: Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test

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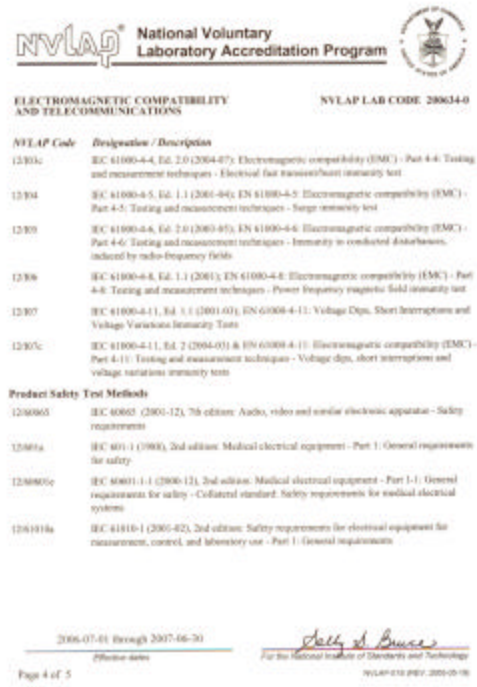

National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS — NVLAP LAB CODE 200634-0

NVLAP Code	Designation / Description
12/IS3c	IEC 61000-4-4, Ed. 2.0 (2004-07): Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
12/IS4	IEC 61000-4-5, Ed. 1.1 (2001-04); EN 61000-4-5: Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
12/IS5	IEC 61000-4-6, Ed. 2.0 (2003-05); EN 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/IS6	IEC 61000-4-8, Ed. 1.1 (2001); EN 61000-4-8: Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
12/IS7	IEC 61000-4-11, Ed. 1.1 (2001-03); EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/IS7c	IEC 61000-4-11, Ed. 2 (2004-03) & EN 61000-4-11: Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests

Product 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
12/60601c	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
12/61010a	IEC 61010-1 (2001-02), 2nd edition: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

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National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS — NVLAP LAB CODE 200634-0

NVLAP Code	Designation / Description
12/61326	IEC 61326, Ed. 2 (2002-02): Electrical equipment for measurement, control and laboratory use - EMC requirements
12/T41b	IEC 60950 (1991-04), 3rd edition: Safety of information technology equipment

Telecommunications Test Methods:

12/GR1089	GR-1089-CORE, Issue 3 (October 2002): Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment

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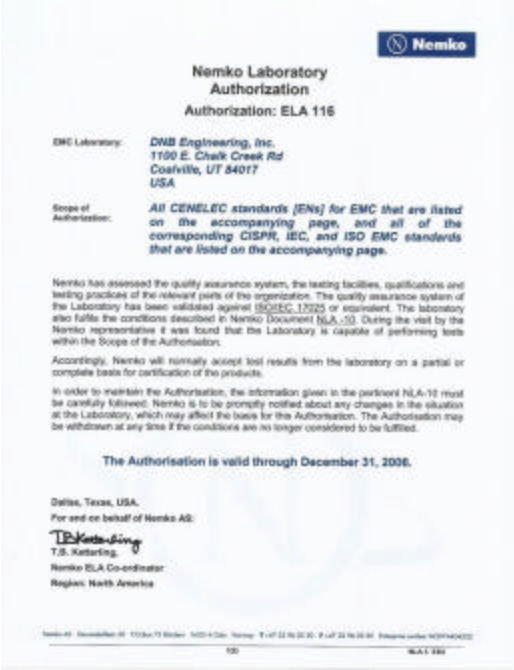
4.5 Nemko Accreditation



Nemko

Nemko Laboratory
Authorization
Authorization: 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 quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA -10. During the visit by the Nemko representative it was found that the Laboratory is capable of performing tests within the Scope of the Authorisation.

Accordingly, Nemko will normally accept test results from the laboratory on a partial or complete basis for certification of the products.

In order to maintain the Authorisation, the information given in the pertinent NLA-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the 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 December 31, 2006.

Dallas, Texas, USA.
For and on behalf of Nemko AS:
T.S. Kettering,
Nemko ELA Co-ordinator
Region: North America

Nemko

Nemko Laboratory
Authorization
Authorization: ELA 116

SCOPE OF AUTHORIZATION

BASIC TESTS AND ASSOCIATED STANDARDS

Generic & Product –Family Standards

Basic Standards

BLANK

BLANK

Dallas, Texas February 01, 2005

T.S. Kettering, Nemko ELA Co-ordinator

4.6 APPENDIX C: 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	08FEB07
Amplifier	HP/8447D	U-065	2727A06180	08FEB07
Amplifier	HP/8447D	U-066	2727A06181	08FEB07
Amplifier	HP/8447D	U-068	2727A06184	08FEB07
Bicon Antenna	SCH/BBA9106	U-187	6	22SEP06
Bicon Antenna	SCH/BBA9106	U-186	7	12MAY07
Log P Antenna	SCH/UJALP9107	U-011	11	16MAY07
Log P Antenna	SCH/UHAL09107	U-010	10	21SEP06
Loop Antenna	RS/HF2Z2	U-016	880665/040	15JUL07
Amplifier 1-20 GHz	Miteq/AFS6-02002000 18-P-MP	U-162	428738	14SEP06
Horn Antenna, Double Rdg GD	AH Systems/SAS-571	U-071	417	15JUL07
QP Adapter	HP/85650 A	U-001	2043A00277	02MAY08
Receiver	R&S/ESVP	U-078	879807/048	02MAY07
Receiver	R&S/ESVP	U-083	882402/005	14FEB08
Spectrum Analyzer	Agilent/E7401A	U-257	MY42000103	24DEC06
Spectrum Analyzer	HP/8566B	U-138	2421A00516	2MAY08

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