



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



ELA #116



NVLAP Lab Code 200634-0

REPORT # 66114

Test Completion Date: August 7, 2006

Prepared By:

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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.

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DOCUMENT HISTORY

Revision Letter	Number of Pages	Page No. of Rev.	Description	Date
	35		Document Release	11/14/2006

TABLE OF CONTENTS

1	INTRODUCTION.....	7
1.1	ADMINISTRATIVE DATA AND TEST DESCRIPTION	7
1.2	TEST CONFIGURATION.....	7
1.3	EQUIPMENT DESCRIPTION	7
1.4	MODE OF OPERATION.....	7
1.5	DOCUMENTED EMC CONTROL MEASURES	7
1.6	CLOCK FREQUENCIES.....	7
1.7	TEST VOLTAGE.....	7
1.8	JUSTIFICATIONS.....	7
1.9	ANTENNA INFORMATION	7
1.10	BLOCK DIAGRAM / SCHEMATICS.....	8
1.11	INTERNAL PHOTOGRAPH EQUIPMENT UNDER TEST (EUT).....	9
1.12	EXTERNAL PHOTOGRAPH EQUIPMENT UNDER TEST (EUT).....	10
2	RADIATED EMISSIONS PER PART 15, SUBPART C, SECTION 15.247.....	11
2.1	RADIATED EMISSIONS TEST SETUP AND PROCEDURE	11
2.2	RADIATED EMISSIONS COMPLIANCE DATA	13
2.3	RADIATED EMISSIONS FUNDAMENTAL FREQUENCY COMPLIANCE DATA.....	15
2.4	CLIMATIC CONDITIONS	15
2.5	COMPLIANT STATEMENT	15
2.6	RADIATED EMISSIONS COMPLIANCE DATA	16
2.7	PHOTOGRAPH OF RADIATED EMISSIONS TEST SETUP	17
2.8	BANDWIDTH COMPLIANCE DATA	18
2.8.1	Test Description	18
2.8.2	(2.4744 6dB Bandwidth).....	19
2.8.3	(2.482GHz)	20
2.9	OUT OF BAND CONDUCTED EMISSIONS.....	21
2.9.1	Test Description	21
2.9.2	.001-1GHz Test Data (EUT set to 2.744GHz Transmit Frequency).....	22
2.9.3	.1 - 2.35GHz Test Data (EUT set to 2.744GHz Transmit Frequency).....	23
2.9.4	2.35 – 4.79GHz Test Data (EUT set to 2.744GHz Transmit Frequency).....	24
2.9.5	2.48 – 2.57GHz Test Data (EUT set to 2.482GHz Transmit Frequency).....	25
2.9.6	2.57 – 10GHz Test Data (EUT set to 2.482GHz Transmit Frequency)	26
2.9.7	10 – 24GHz Test Data (EUT set to 2.482GHz Transmit Frequency)	27
2.10	DUTY CYCLE INFORMATION	28
2.10.1	Test Description	28
2.10.2	Duty Cycle Calculations	28
3	EQUIPMENT MANUFACTURED AFTER COMPLIANCE TESTING.....	29
4	APPENDIX SECTION.....	30
4.1	APPENDIX A LIST OF ATTACHMENTS.....	30
4.2	APPENDIX B: UNCERTAINTY TOLERANCE.....	31
4.3	APPENDIX C: SITE CHARACTERISTICS CHALK CREEK EMI TEST SITE.....	32
4.3.1	Ambient Emissions.....	32
4.4	NVLAP ACCREDITATION.....	33
4.4.1	NVLAP Accreditation	34
4.5	NEMKO ACCREDITATION.....	35

4.6	APPENDIX C: EMC INSTRUMENTATION AND MEASUREMENT EQUIPMENT	36
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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:



Carrie Yates
Quality Assurance Manager

November 14, 2006

Date

Report Reviewed By:



Clay Allred
Lab Manager

November 14, 2006

Date

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

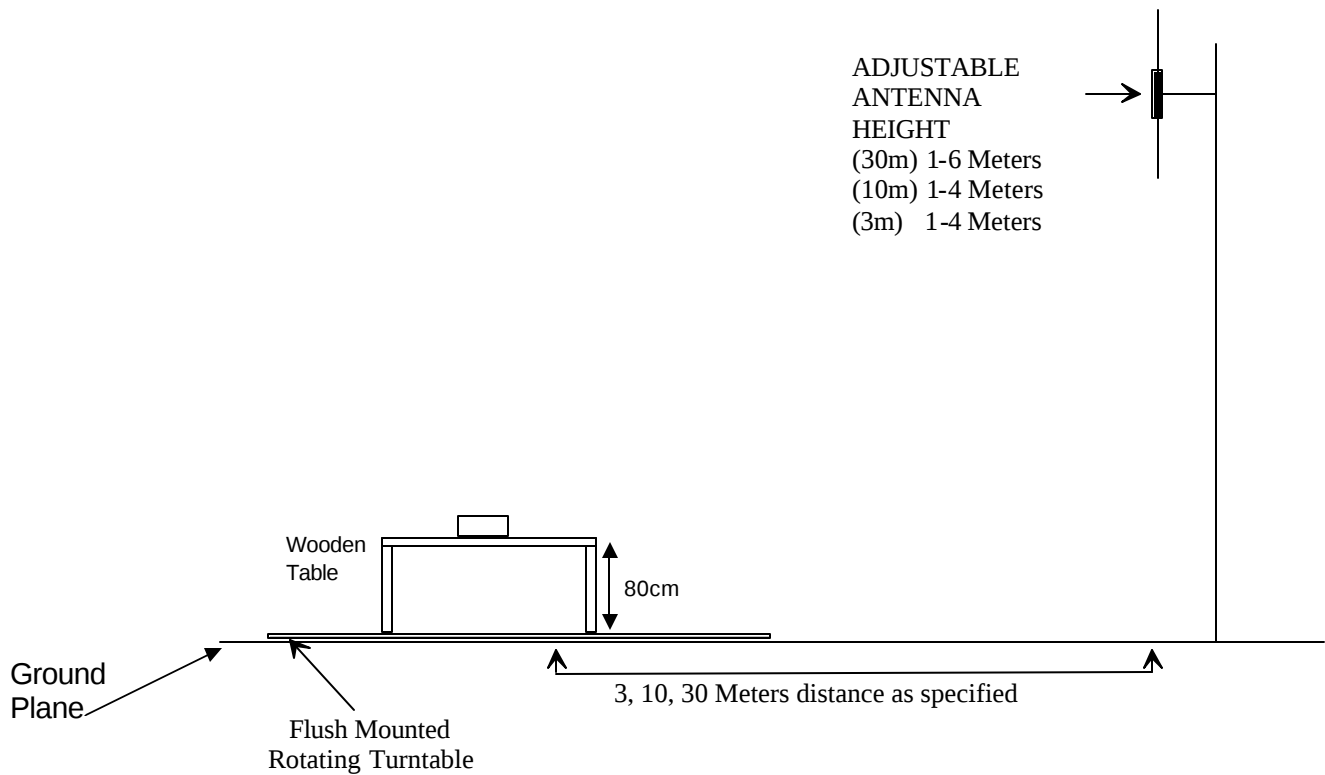
See Appendix A for Attachment Information

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° . 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:

$$0 \text{ dBm (50 ohms)} = 107 \text{ dB}\mu\text{V (50 ohms)}$$

The signal level (dB μ V) = indicated signal level (dBm) + 107 dB. To obtain the signal level in dB μ V/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	dB μ V
Antenna Factor	+7.5	dB/m
Cable Loss	+2.0	dB
Preamplifier	-25.5	dB
	-16.0	dB/m
Field Strength dB μ V/m at 3 Meter =	33.0	dB μ V/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	Meas'd	Amp	Cable	Antenna	Total	Total	Limit	Delta	Azimuth	Height	Hor	Meas. Type
(MHz)	(dBuV)	Factors (dB)	Factors (dB)	Factors (dB)	Factors (dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	(degree)	(m)	Vert	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	Meas'd	Duty	Crrct	Filter & Amp	Cable	Antenna	Total	Total	Limit	Delta	Table	Height	Hor	Meas. Type
(MHz)	(dBuV)	(dB)	(dBuV)	Factors (dB)	Factors (dB)	Factors (dB)	Factors (dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	(deg)	(m)	Vert	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	Meas'd	Amp	Cable	Antenna	Total							Meas. Type Ave, PK
(MHz)	(dBuV)	Factors	Factors	Factors	Factors	Total	Limit	Delta	Azimuth	Height	Hor	
		(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	(degree)	(m)	Vert	
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								
				Filter & Amp										Meas. Type Ave, PK
Freq	Meas'd	Duty	Crrct	Factors	Factors	Antenna	Total	Total	Limit	Delta	Table	Height	Hor	
(MHz)	(dBuV)	(dB)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	(deg)	(m)	Vert	
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						
				Filter & Amp										
		Duty			Cable	Antenna	Total							Meas. Type
Freq	Meas'd	Cycle	Crrct	Factors	Factors	Factors	Factors	Total	Limit	Delta	Table	Height	Hor	Ave, PK
(MHz)	(dBuV)	(dB)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	(deg)	(m)	Vert	
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						
				Filter & Amp										
		Duty			Cable	Antenna	Total							Meas. Type
Freq	Meas'd	Cycle	Crrct	Factors	Factors	Factors	Factors	Total	Limit	Delta	Table	Height	Hor	Ave, PK
(MHz)	(dBuV)	(dB)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	(deg)	(m)	Vert	
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.

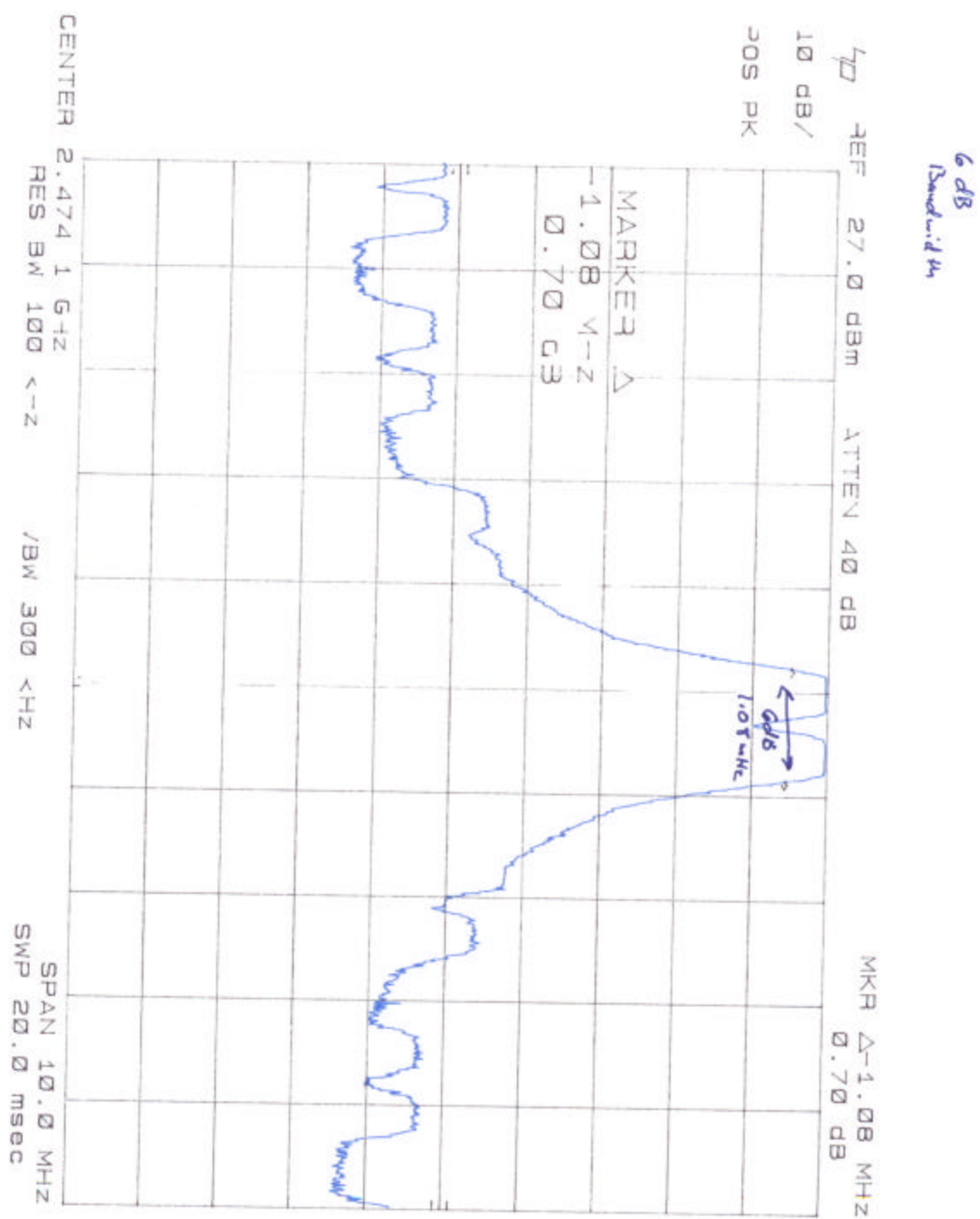
Resolution Bandwidth = 100kHz

Video Bandwidth = 300kHz

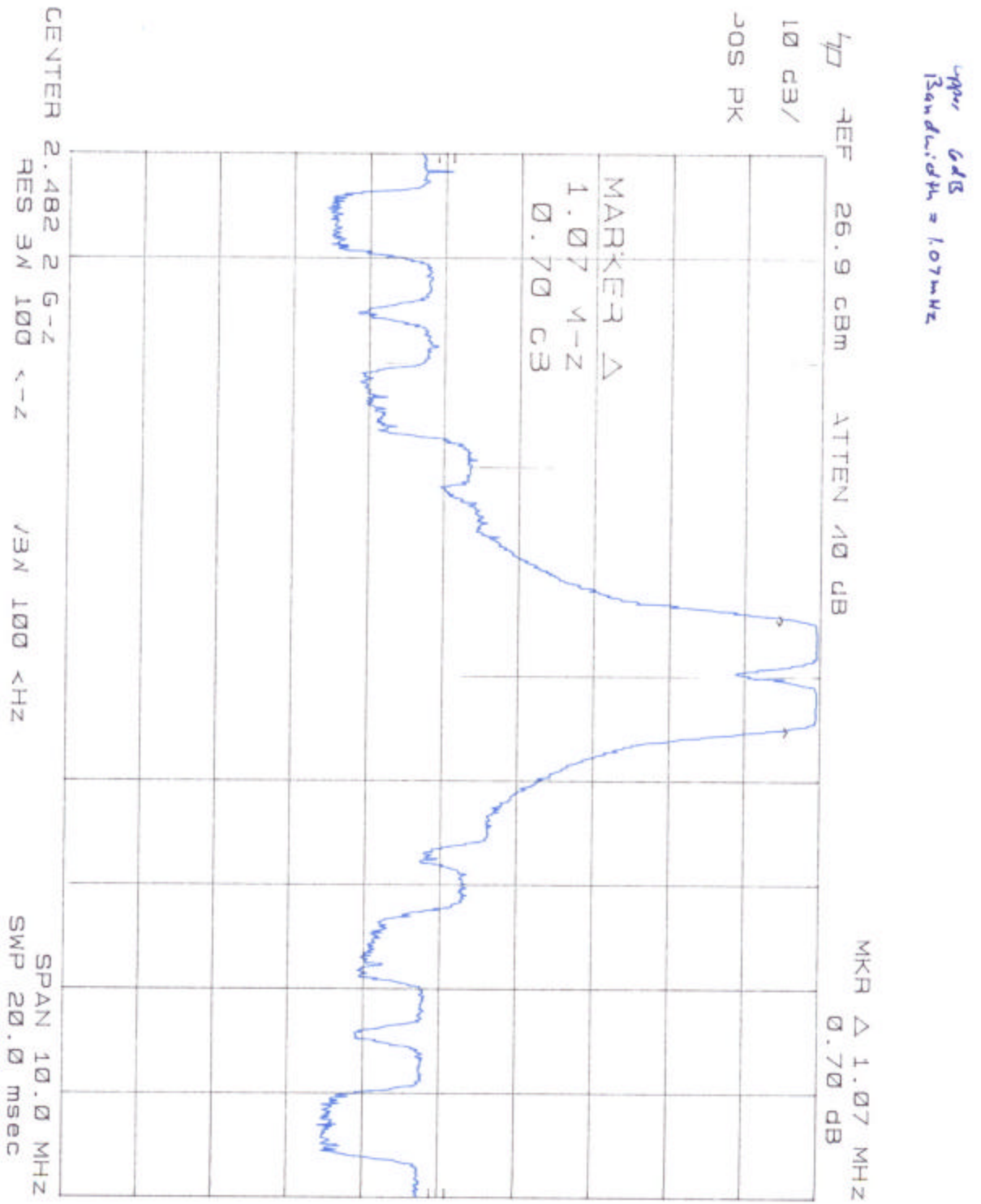
Frequency Range under test = 2.4744GHz – 2.482GHz

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)



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.

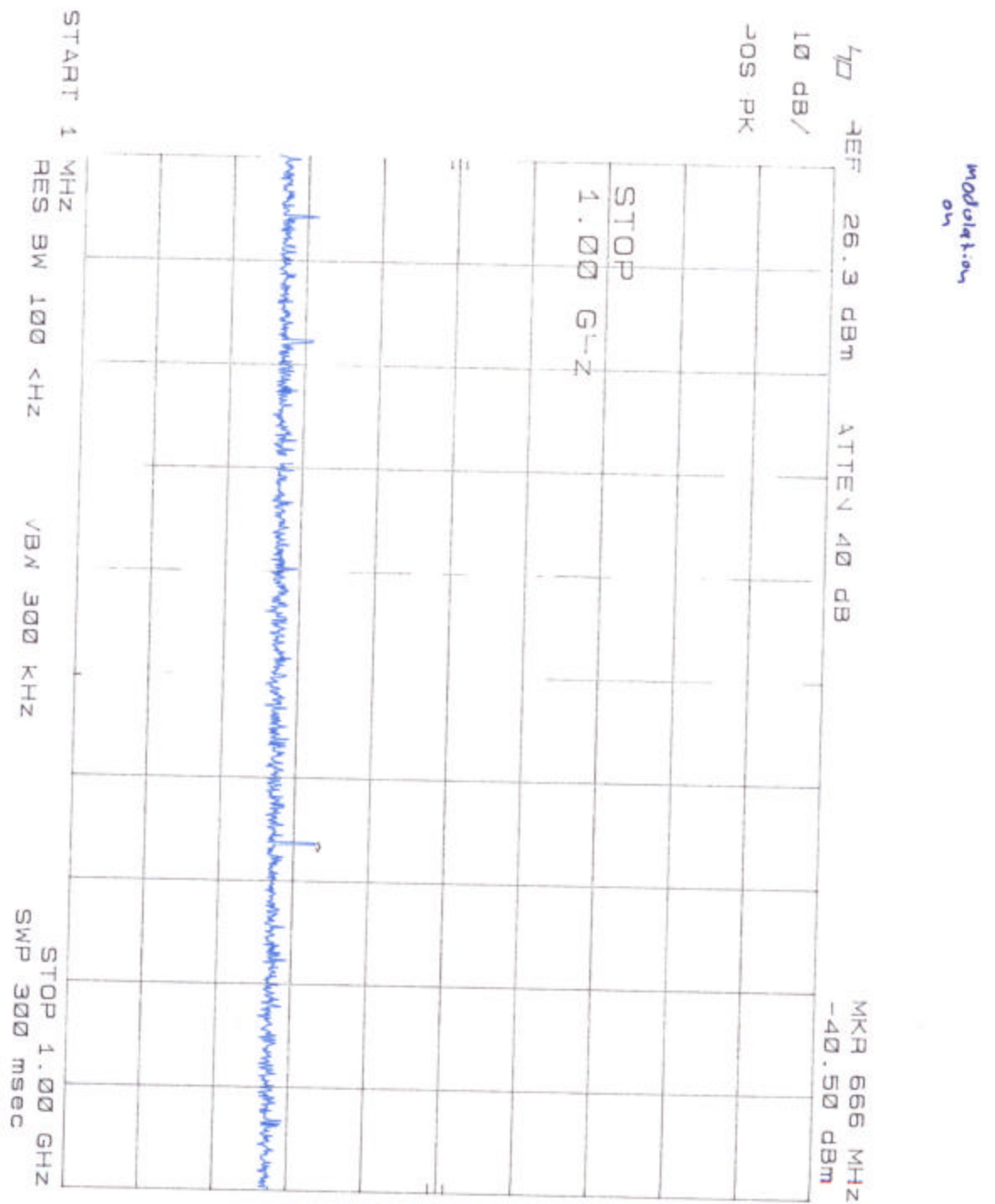
Resolution Bandwidth = 100kHz

Video Bandwidth = 300kHz

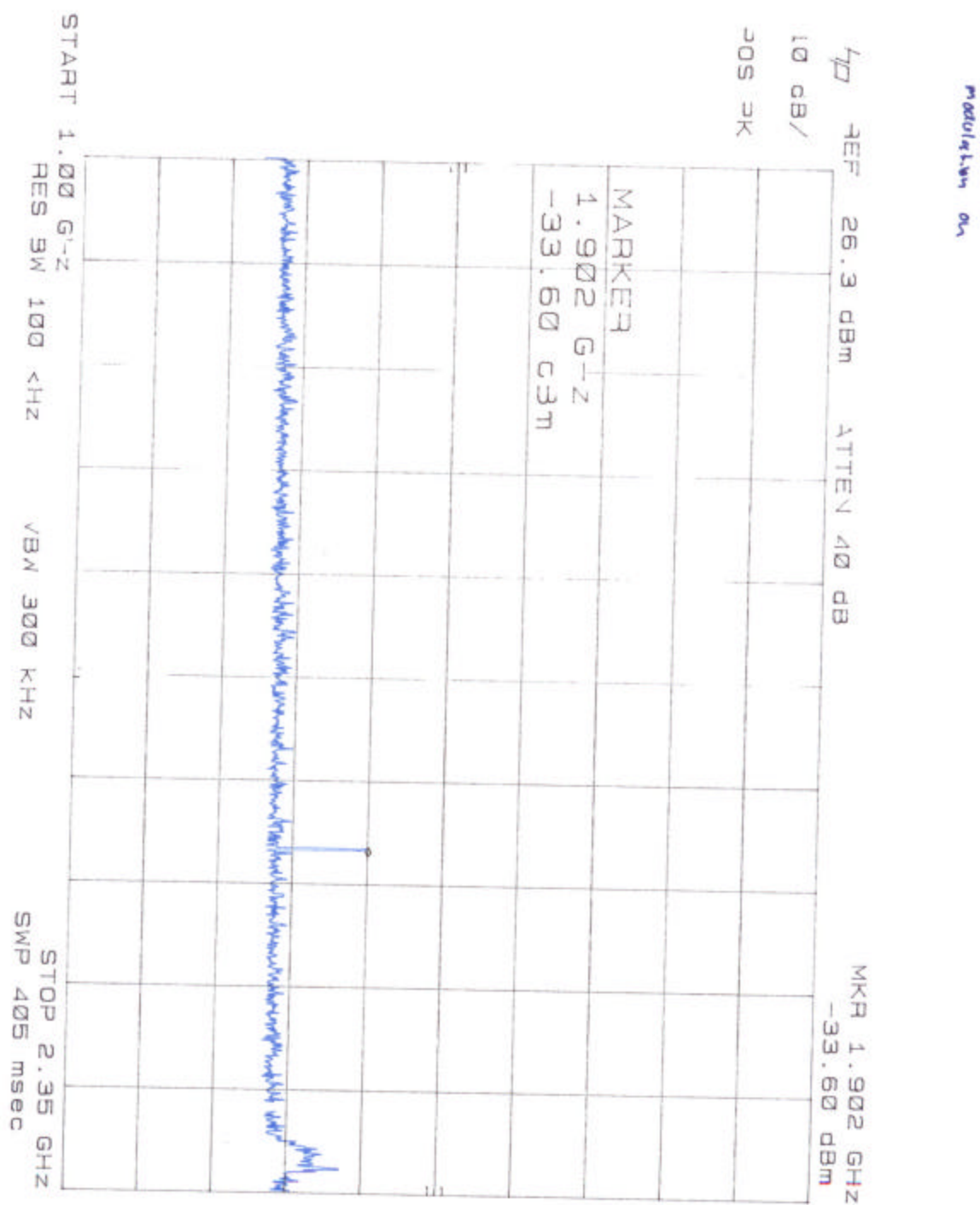
Frequency Range under test = 2.4744GHz – 2.482GHz

Refer to following test plots for

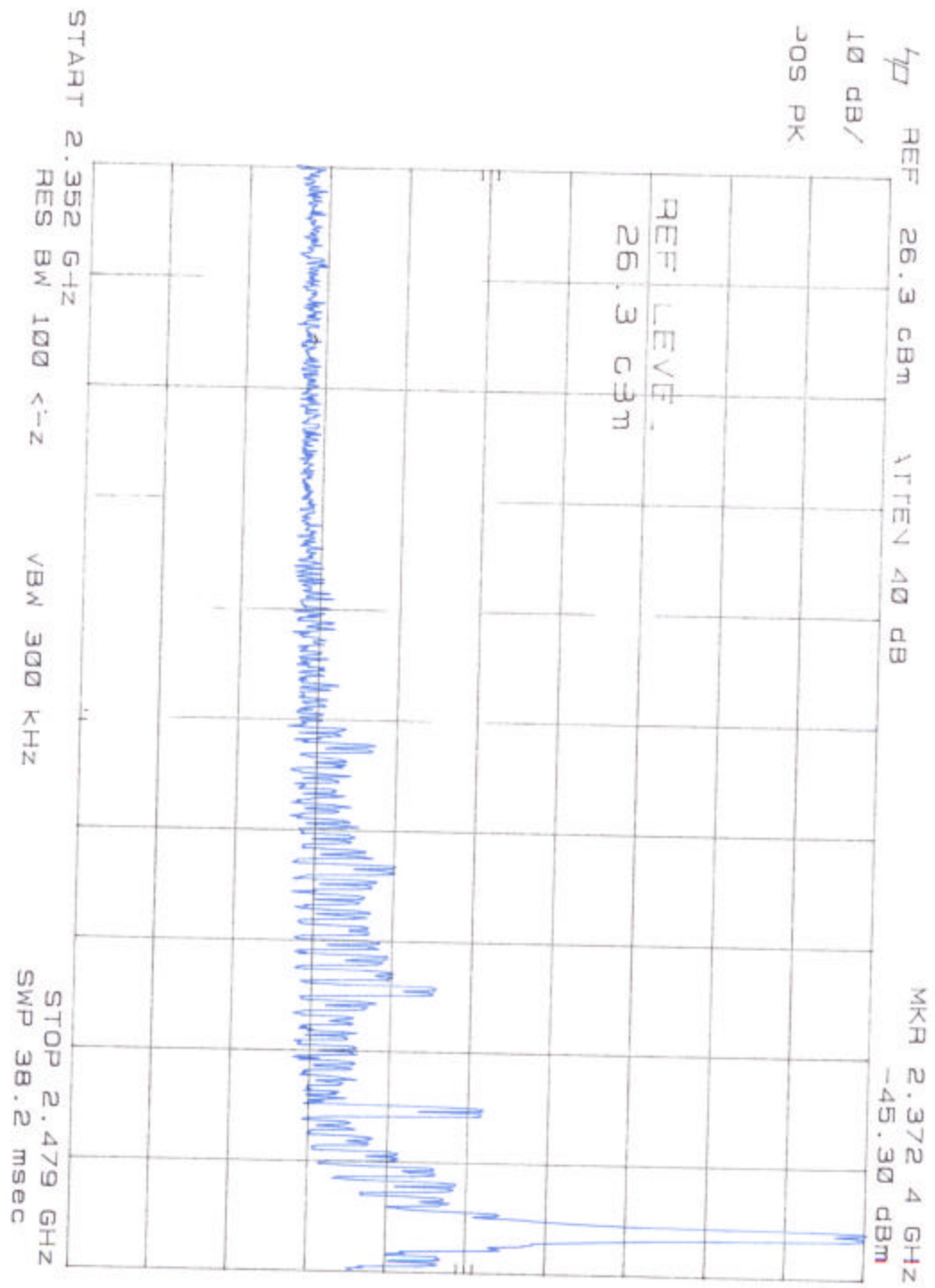
2.9.2 .001-1GHz Test Data (EUT set to 2.744GHz Transmit Frequency)



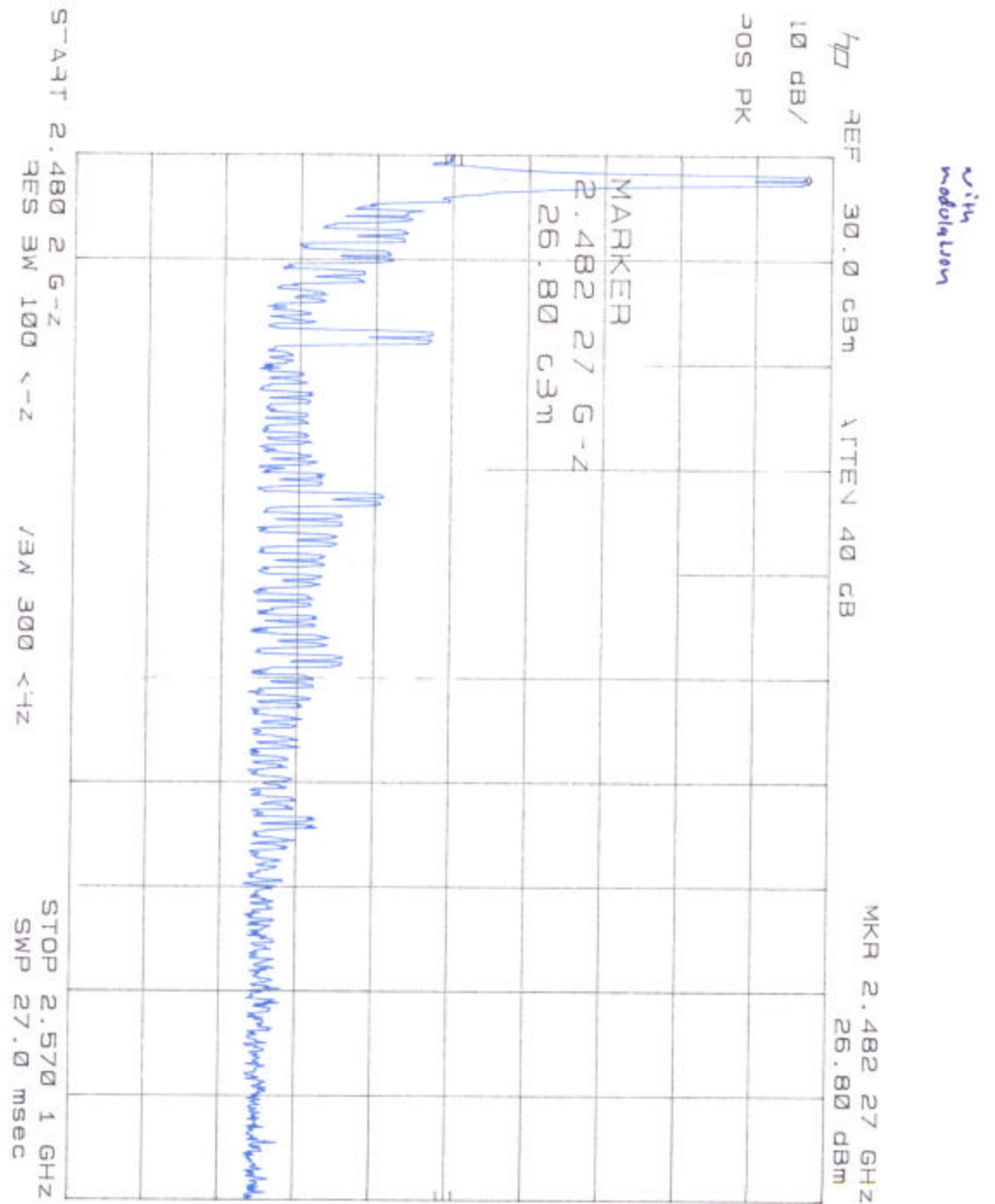
2.9.3 .1 - 2.35GHz Test Data (EUT set to 2.744GHz Transmit Frequency)



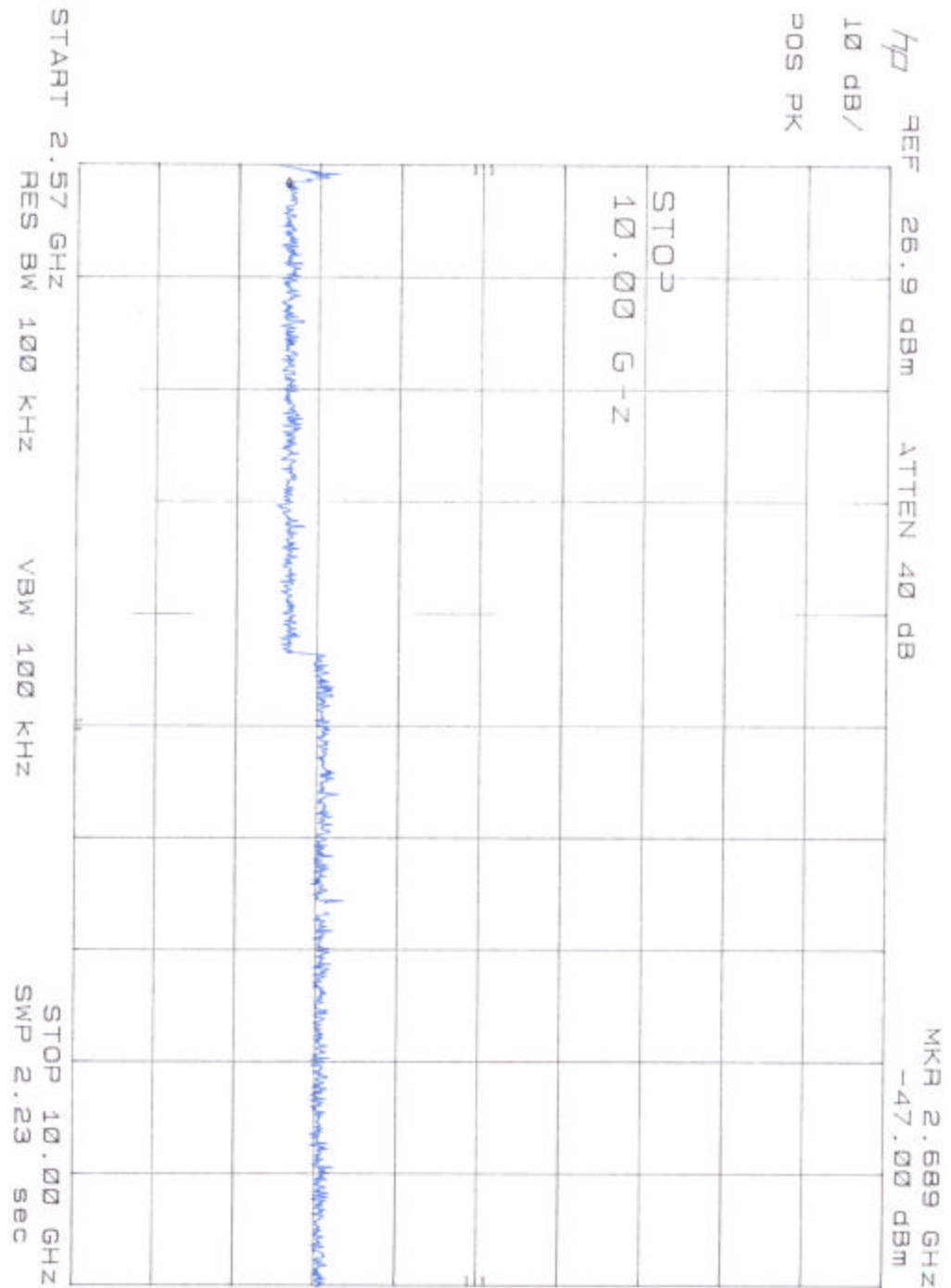
2.9.4 2.35 – 4.79GHz Test Data (EUT set to 2.744GHz Transmit Frequency)



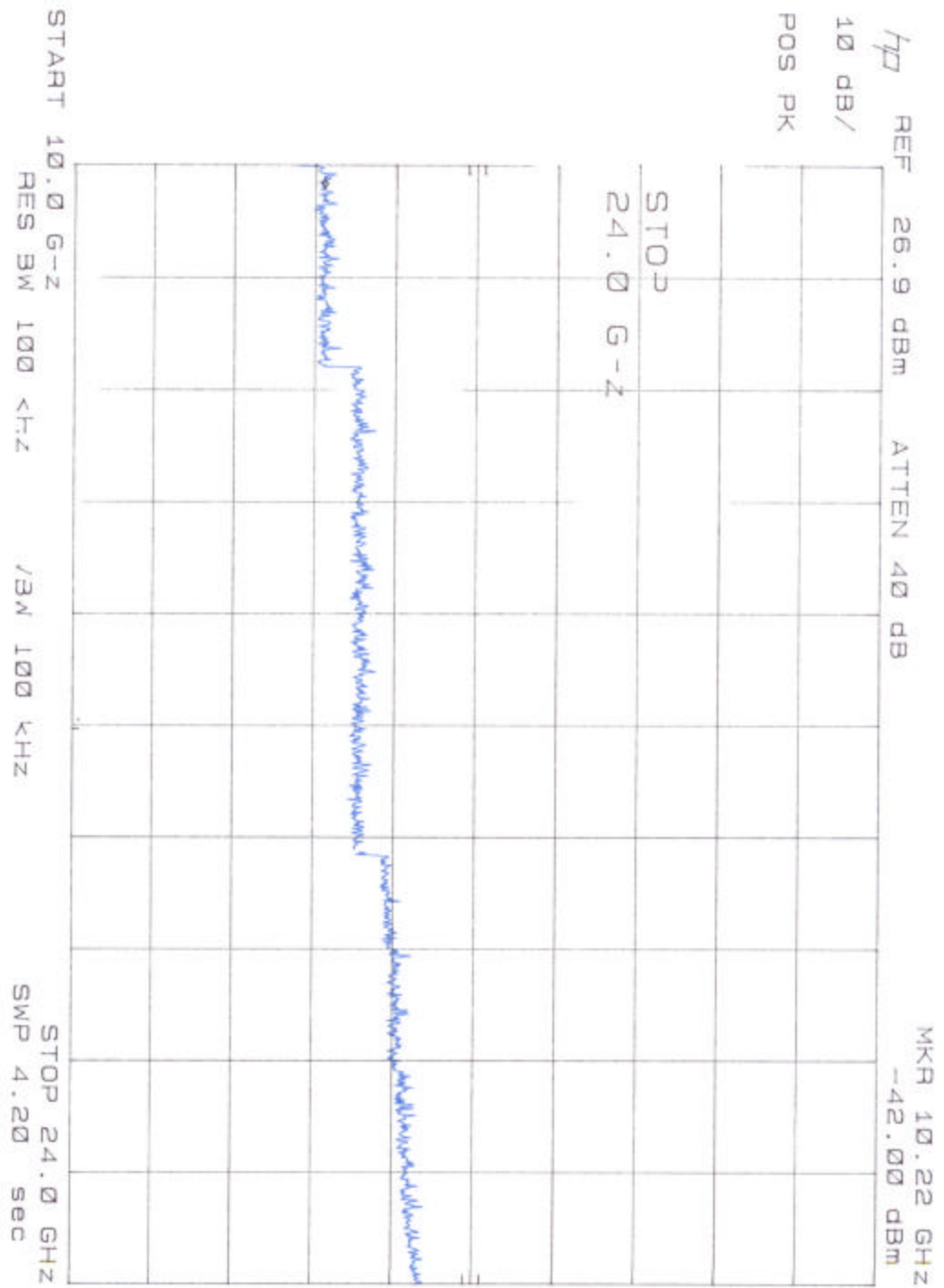
2.9.5 2.48 – 2.57GHz Test Data (EUT set to 2.482GHz Transmit Frequency)



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)

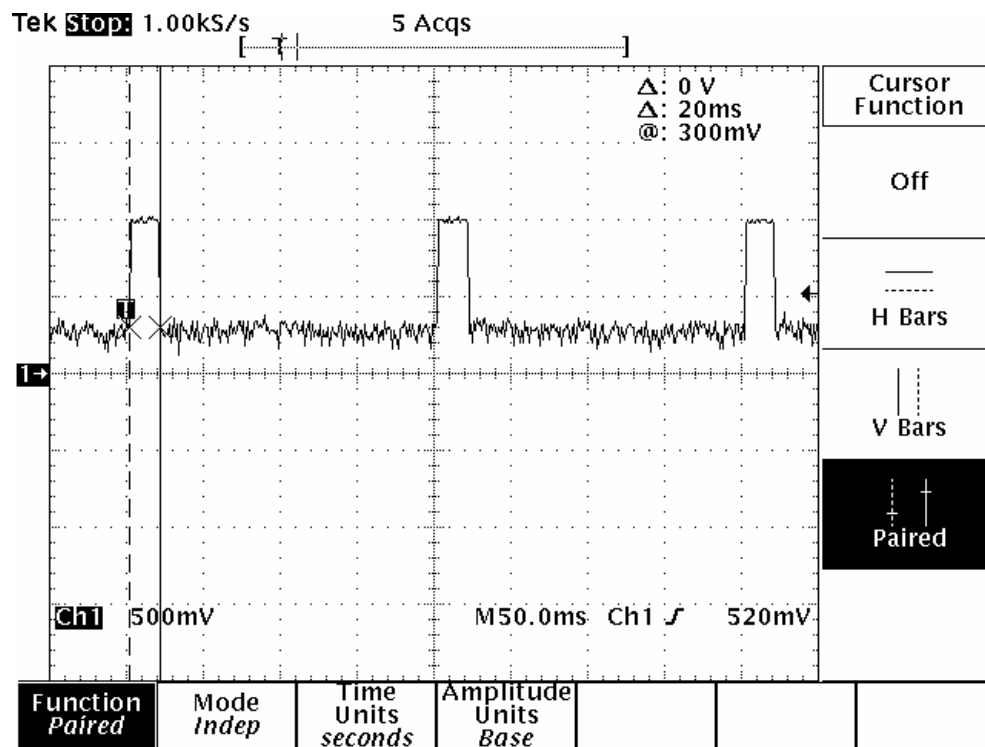
2.10.1 Test Description

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



Dolly A. Bruce
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 Nitz
Phone: 714-870-7781 Fax: 714-870-5081
E-Mail: mcnitz@dnbenginc.com
URL: http://www.dnbenginc.com

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

NVLAP Code Designation / Description

Emission Test Methods:

12610006c	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
13610006d	EN 61000-6-4 (2001) and IEC 61000-6-4 (1997): Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
13610006e	IEC 61000-6-4, First edition (1997-01): Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 4: Emission standard for industrial environments
12CEB11a	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
12CEB11g	CISPR 11, Ed. 4.1 (2004-09): Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
13CEB13a	IEC/CISPR 13, Ed. 4.1 (2007): 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

Dolly A. Bruce
For the National Institute of Standards and Technology

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

Page 1 of 5

4.4.1 NVLAP Accreditation

ELECTROMAGNETIC COMPATIBILITY
AND TELECOMMUNICATIONS

NVLAP LAB CODE: 200634-0

NVLAP Code Designation / Description

12C3014	CISPR 14-1 (March 30, 2000): Limits and Methods of Measurement of Radio Interference Characteristics of Household Electrical Appliances, Portable Tools and Similar Electrical Appliances - Part 1: Emissions
12C3014a	EN 55014-1 (1993), A1 (1997), A2 (1999)
12C3014b	ANSI C63.10-4 (1995)
12C3014c	CNS 1350-1: Electromagnetic Compatibility Requirements for household appliances, electric tools and similar apparatus - Part 1: Emissions
12C3014d	IEC CISPR 14-1, Edition 4.2 (2002-05): Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12C3022	IEC CISPR 22 (1997) & EN 55022 (1996) + A1 (2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12C3022a	IEC CISPR 22 (1997) & EN 55022 (1996): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1999) and Amendment 2 (1999)
12C3022a1	IEC CISPR 22 (1997) & EN 55022 (1996) & A1 (2000), A2 (2001): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12C3022b	CNS 13418 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12C3022c	IEC CISPR 22, Fourth Edition (2003-04) & EN 55022 (1996): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12C3051a	IEC 60000-3-2, Edition 2.1 (2001-10), EN 60000-3-2 (2000), and ANSI C63.279.1 (2000): Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A)

2006-07-01 through 2007-06-30

Effective dates

Page 2 of 5

John A. Bruce
For the National Institute of Standards and Technology
NVLAP #10 (REV. 2003-05-18)

ELECTROMAGNETIC COMPATIBILITY
AND TELECOMMUNICATIONS

NVLAP LAB CODE: 200634-0

NVLAP Code Designation / Description

12EM005	IEC 61000-5-3, Edition 1 (2002-05) & EN 61000-5-3, A1 (2003): EMC - Part 5-3: 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
12FCC10b	ANSI C63.6 (2001) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators
12TS1	ANSI C63.22 (2002) and ANSI C63.22-1 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

Immunity Test Methods:

12C3014a	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
12C3020b	IEC CISPR 38, 38b Ed. (2002-02): Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement
12C3024	IEC CISPR 24 (1997) & EN 55024 (1998) + A1 (2001), A2 (2002): Information technology equipment - Immunity characteristics - Limits and methods of measurement
12B1	IEC 61000-4-2, Ed. 1.2 (2001) + A1, A2, EN 61000-4-2: Electrostatic Discharge Immunity Test
12B2	IEC 61000-4-3, Ed. 2.0 (2002-03); EN 61000-4-3 (2002): Radiated Radio-Frequency Electromagnetic Field Immunity Test
12B3a	IEC 61000-4-3, Ed. 2.1 (2002-05); EN 61000-4-3 (2002): Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
12B3	IEC 61000-4-3 (1995), A1 (2000), A2 (2001); EN 61000-4-3: Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test

2006-07-01 through 2007-06-30

Effective dates

Page 3 of 5

John A. Bruce
For the National Institute of Standards and Technology
NVLAP #10 (REV. 2003-05-18)

ELECTROMAGNETIC COMPATIBILITY
AND TELECOMMUNICATIONS

NVLAP LAB CODE: 200634-0

NVLAP Code Designation / Description

12B3a	IEC 61000-4-3, Ed. 2.0 (2002-05): Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Electrical fast transient/burst immunity test
12B3a	IEC 61000-4-3, Ed. 2.1 (2002-05); EN 61000-4-3: Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Large immunity test
12B3b	IEC 61000-4-3, Ed. 2.0 (2002-05); EN 61000-4-3: Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12B3b	IEC 61000-4-3, Ed. 1.1 (2001); EN 61000-4-3: Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Power frequency magnetic field immunity test
12B3c	IEC 61000-4-11, Ed. 1.1 (2001-03); EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12B3c	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

12S0065	IEC 60601 (2001-12), 7th edition: Audio, video and similar electronic apparatus - Safety requirements
12S0065a	IEC 60601-1 (1993), 2nd edition: Medical electrical equipment - Part 1: General requirements for safety
12S0065b	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
12S1010a	IEC 61110-1 (2005-02), 2nd edition: Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

2006-07-01 through 2007-06-30

Effective dates

Page 4 of 5

John A. Bruce
For the National Institute of Standards and Technology
NVLAP #10 (REV. 2003-05-18)

ELECTROMAGNETIC COMPATIBILITY
AND TELECOMMUNICATIONS

NVLAP LAB CODE: 200634-0

NVLAP Code Designation / Description

12B120b	IEC 61326, Ed. 2 (2002-02): Electrical equipment for measurement, control and laboratory use - EMC requirements
12B14b	IEC 60650 (1994-04), 3rd edition: Safety of information technology equipment

Telecommunications Test Methods:

12GR009	GR-109-CORE, Issue 3 (October 2002): Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment
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2006-07-01 through 2007-06-30

Effective dates

Page 5 of 5

John A. Bruce
For the National Institute of Standards and Technology
NVLAP #10 (REV. 2003-05-18)

			
Nemko Laboratory Authorization			
Authorization: ELA 116			
SCOPE OF AUTHORIZATION			
BASIC TESTS AND ASSOCIATED STANDARDS			
<i>(Capability to perform a test implies that you are product (family)-compliant with the basic test & any related test as shown in referenced table in test.)</i>			
Generic & Product - Family Standards			
EN 50078	EN 50078-2	EN 50078-1 + 2007	
EN 50082-2:2004	EN 50082-2:1996	EN 50082-1:1996	
EN 50134-4:1996 + A1:1998 + A2:2001	EN 50134-2:1996	EN 50134-1:1997 + A1:1998 + A2:2001 EN 50134-1:1997 + A1:1998 + A2:2001	
EN 50167-1:1992	EN 50167-2:1997	EN 50167-1:1997	
EN 50222-2:2007 + A1:2009	EN 50222-1:1997 + A1:2001 + A2:2002 EN 50222-1:1997 + A1:2001 + A2:2002	EN 50222-1:1997 + A1:2001 EN 50222-1:1997 + A1:2001 + A2:2002	
EN 50222-3:2002 + A1:2001 + A2:2002 EN 50222-3:2002 + A1:2001 + A2:2002	EN 50222-3:1997 + A1:2001 EN 50222-3:1997 + A1:2001	EN 50222-3:1997 + A1:2001 EN 50222-3:1997 + A1:2001 + A2:2002	
EN 50244-1:1998 + A1:2001 + A2:2002 EN 50244-1:1998 + A1:2001 + A2:2002	EN 50244-1:1998 EN 50244-1:1998	EN 50244-1:1998 EN 50244-1:1998	
EN 50244-2:1998 + A1:2001 + A2:2002 EN 50244-2:1998 + A1:2001 + A2:2002	EN 50244-2:1998 EN 50244-2:1998	EN 50244-2:1998 EN 50244-2:1998	
EN 50244-3:1998 + A1:2001 + A2:2002 EN 50244-3:1998 + A1:2001 + A2:2002	EN 50244-3:1998 EN 50244-3:1998	EN 50244-3:1998 EN 50244-3:1998	
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EN 50244-20:1998 + A1:2001 + A2:2002 EN 50244-20:1998 + A1:2001 + A2:2002	EN 50244-20:1998 EN 50244-20:1998	EN 5024	

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/HF222	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

END of Report 66114