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

CERTIFICATION REPORT
FOR
INTENTIONAL RADIATOR

Per

Part 15 Subpart C
CFR 47, Section 15.231 paragraph (a)

EUT: TekVet

Nemko

ELA #116

NVLAP Lab Code 200634-0

PREPARED FOR APPLICANT:
Colt Technologies
2825 E. Cottonwood Parkway
Salt Lake City, UT. 84121

REPORT # 46066F
TEST COMPLETION DATE: 5/25/04

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 TEKVET, the following tests were performed:

REQUIREMENTS	STATUS	COMPLIANT Yes/No/NA
47 CFR Part 15, Subpart C	Section 15.231	Yes

Signed By:

Clay Allred
Lab Manager
DNB Engineering Inc.

DOCUMENT HISTORY

Revision Letter	Number of Pages	Page No. of Rev.	Description	Date
	37		Document Release	7/7/04

TABLE OF CONTENTS

TRANSMITTAL SUMMARY

Unit tested:	TEKVET
Specifications:	47 CFR Part 15 Subpart C section 15.231(a) / ANSI C63.4
Purpose of Report:	This report was prepared to document the status of the **TEKVET** with requirements of the standards listed above
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 electromagnetic immunity and 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 sample's electromagnetic immunity and emissions characteristics as of the dates and at the times of the test under the conditions herein specified.

Equipment Tested: TEKVET

Test Completion Date: 5/21/04

Report Written By:

7/7/2004

Clay Allred
Lab Manager

Date

Report Reviewed By:

7/7/2004

Carrie Yates
Quality Assurance Manager

Date

1. INTRODUCTION

1.1 Administrative Data

1.1.1 REQUEST FOR CERTIFICATION

Applicant: **Colt Technologies**
2825 E. Cottonwood Parkway Suite 400
Salt Lake City, UT. 84121

Contact: Hokulani Halena / Larry Roberts
Phone Number: 801-365-2222 / 801-756-7116
Fax Number: 801-365-2225
Email: hokulani@email.com / dradtsrif@qwest.net
Test Completion Date: May 25, 2004

Equipment Under Test (EUT): **TEKVET**
FCC ID **:SBSCTVTT1**

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	Comments/ FCC ID#
1	Transmitter	**TekVet Smart Sensor**		X	Battery operated	SBSCTTVT1

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

1.3 Equipment Description

The TekVet smart sensor / transmitter is used to continuously monitor the temperature of cattle in feedlots. It is used to identify a sick animal as soon practically possible. This is done by monitoring the ear temperature. When the animal is in “Alarm Mode” (temperature is outside of the normal operating range), the TAG Identity, temperature reading and checksum are transmitted at hourly intervals during the daytime hours. This allows the sick animal to be identified and treated. As soon as the temperature drops to the normal operating range, the Tag reverts to the Non-Alarm operating mode. Twice a night, each tag transmits a TAG operating properly packet “TOP”.

1.3.1 ALARM INFORMATION TRANSFER:

Each packet consists of a 5 byte message that is Manchester encoded. The symbol rate is 2 Kbaud nominal. The data rate is 1 KBPS nominal. There is also one fag / start bit for each packet. A packet takes approximately 41.5 mS to transmit. The Alarm and TOP packets are the same length.

1.3.2 MOUNTING:

The transmitter is mounted on the ear of a cow. The temperature probe extends approximately 3.5 inches into the aural canal. The electronics module hangs on the ear via top and bottom tag mounting pins that pierce the ear. The antenna extends laterally from the module toward the ear's outer tip.

1.4 Mode of operation

The EUT was setup and operating in a transmit state.

1.5 Antenna Construction

The antenna is a ¼ wavelength lateral monopole that extends horizontally. It is horizontally polarized. (See photographs of section 1.12)

1.6 Circuit Description

The RF Transmitter frequency is stabilized by a 418MHz SAW resonator (See Schematics of section 1.10)

1.7 Clocks and Oscillators:

The processor uses an internal 4 MHz clock that is powered down most of the time. It also has an external 32.768 KHz low power oscillator that is operating constantly

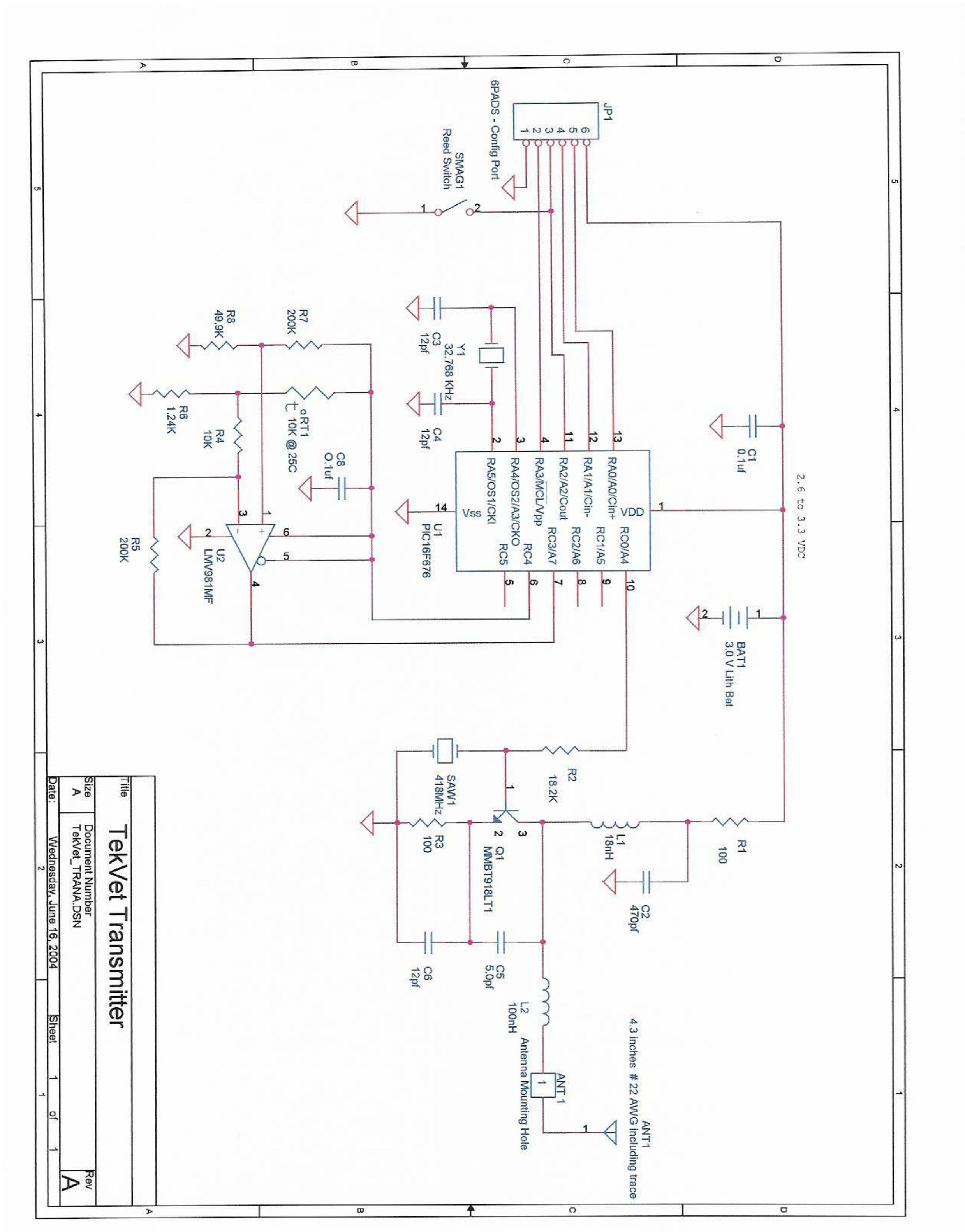
1.8 Test Plan Summary

Refer to the Executive Summary on Page 2

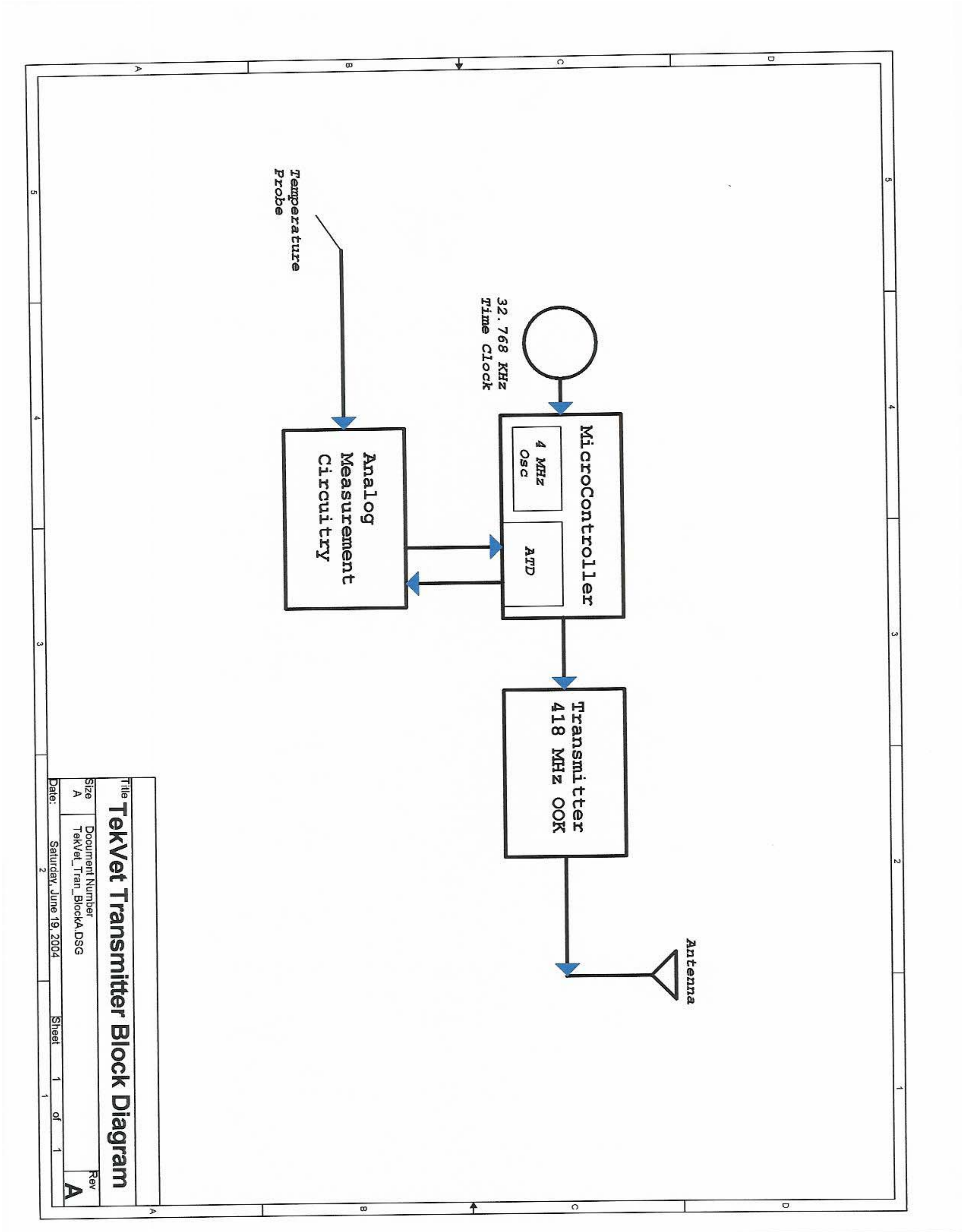
1.9 Justifications

None

1.10 Schematics

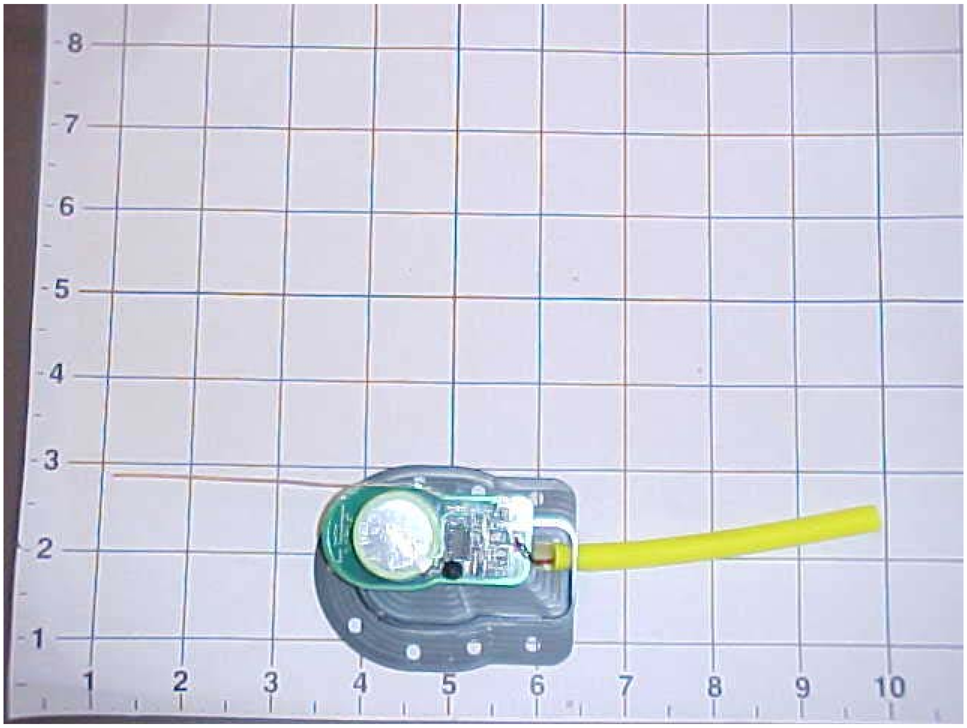


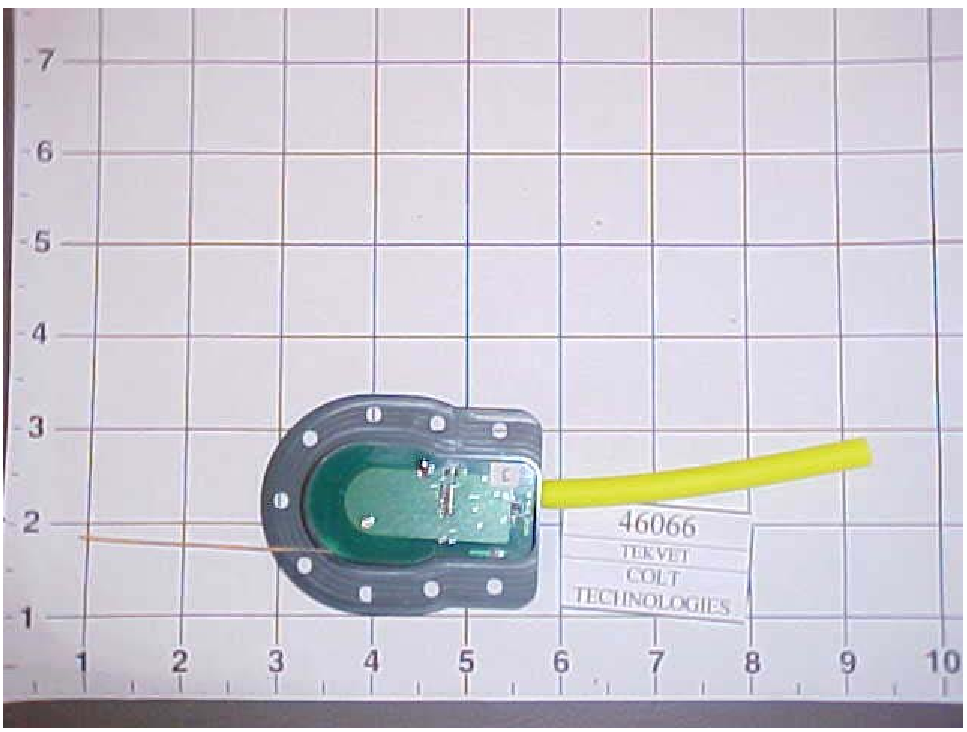
1.11 Block Diagram



1.12 Photograph of

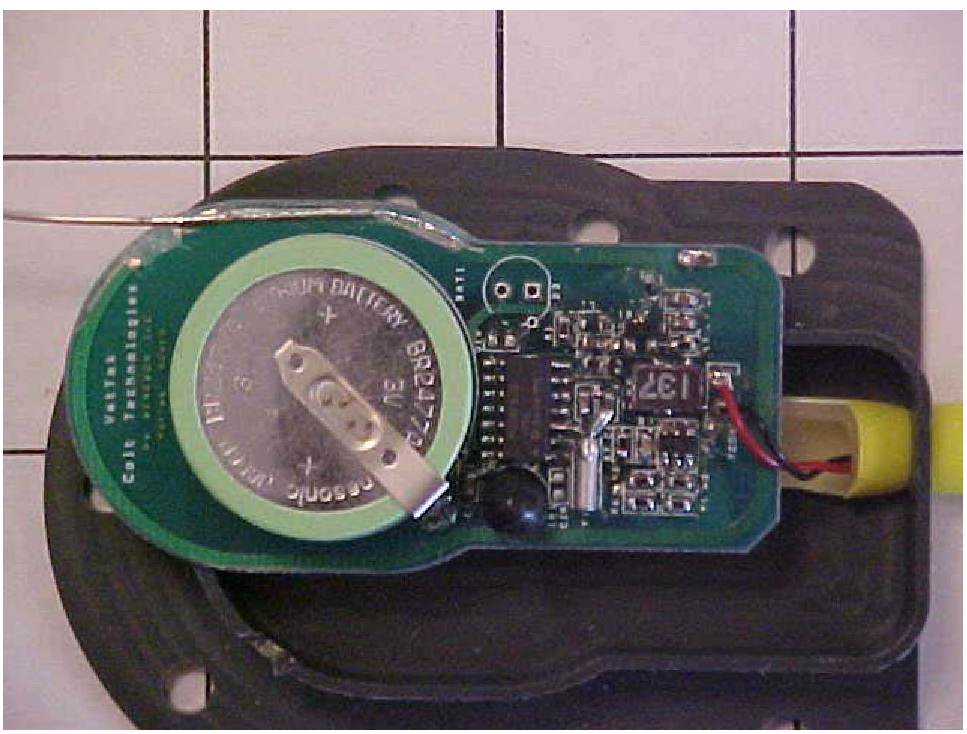
EUT: **TEKVET**
View: Front & Back





1.13 Photograph of

EUT: **TEKVET**
View: Internals



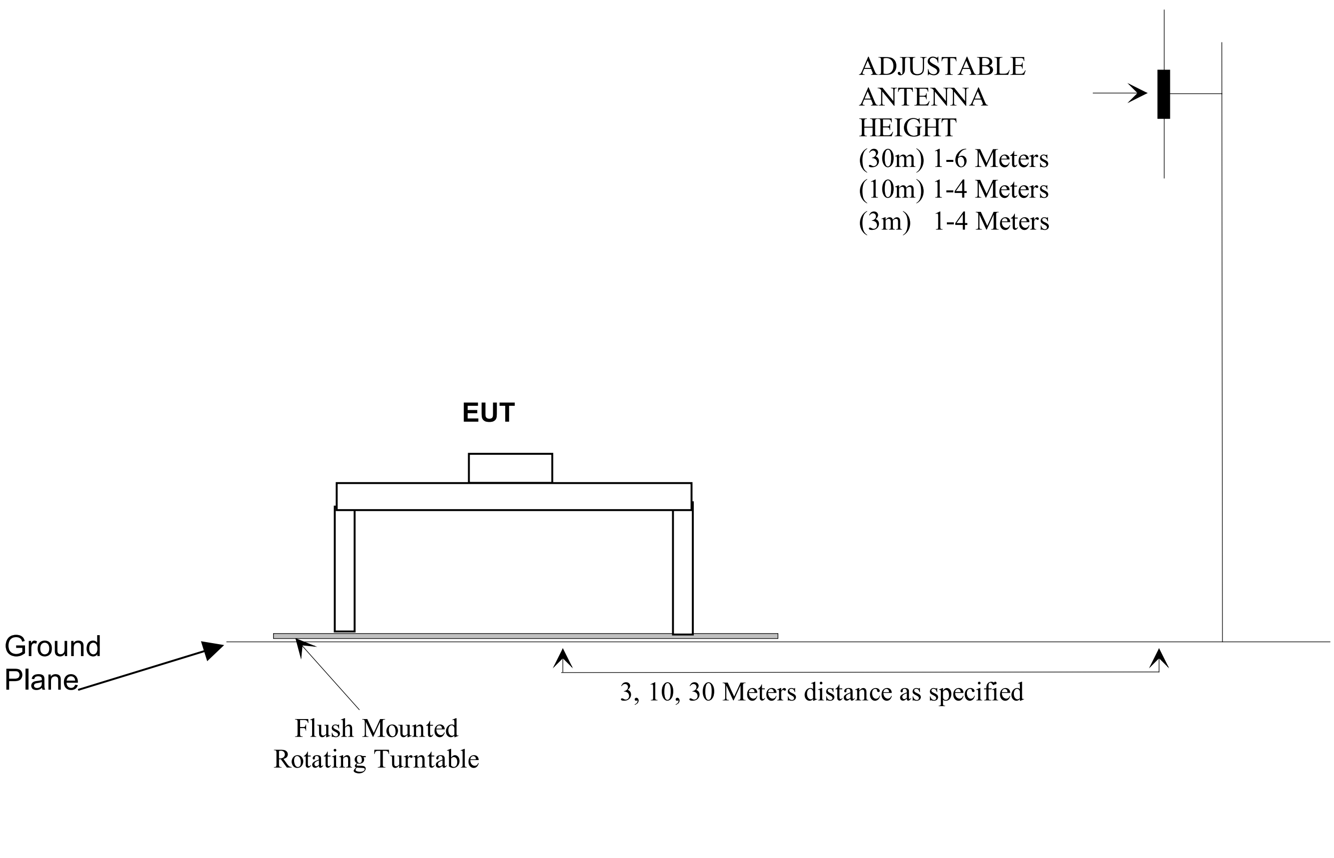
2. RADIATED EMISSIONS FCC CFR 47 PART 15 SUBPART C

2.1 Radiated Emissions

2.1.1 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 below. 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 - contd.

The EUT is put into the operational test mode as stated in Section 1.4, it is 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 into with the receiver. If no emissions are found, the noise floor will be entered to 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 8566B 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 dBuV/m it is necessary to add the antenna factor in dB.

Example of Typical Calculation

Measurement Distance = 3 Meter

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

2.2 Radiated Emissions Compliance Data

The EUT was compliant with CFR 47 Part 15 Subpart C 15.231 (a)

Fundamental Frequency Measurements
Per CFR 47 part 15 at 3 meters

Fundamental Frequency Test Data

Colt Technologies						EUT: TEKVET				
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 Hort/Vert**	**Meas Type**
418.01	82.6	26.2	5.8	17.7	-2.7	**79.9**	80.3	**-0.40**	**Hor/**	**QP**
418.03	75.5	26.2	5.8	17.6	-2.8	**72.7**	80.3	**-7.60**	**Vert**	**QP**

Spurious Radiated Emissions Test Data

Colt Technologies						EUT: TEKVET				
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 Hort/Vert**	**Meas Type**
836.03	37.0	26.7	8.7	24.0	6.0	**43.0**	46.0	**-3.00**	**Hort**	**QP**
836.04	33.2	26.7	8.7	23.4	5.4	**38.6**	46.0	**-7.40**	**Vert**	**QP**
117.92	26.3	26.0	3.0	12.1	-10.9	**15.4**	43.5	**-28.10**	**Vert**	**QP**
70.02	24.6	26.2	2.4	5.9	-17.9	**6.7**	40.0	**-33.30**	**Vert**	**QP**

- Highest frequencies relative to the Limit.

2.3 Climatic Conditions

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

	Measured Value	Acceptable
Ambient Temperature	16 C	15 to 35° C
Relative Humidity	39%	25 to 75%

2.4 Compliant Statement

The EUT was compliant with **Part 15 Subpart C**

YES	NO
CA	

CA Test Engineer's Initials

2.5 Test Results of Fundamental Frequency (418.0MHz)

46066 Colt tech(4/99) DNB Engineering, Inc. Page 1

RADIATED EMISSIONS
CFR 47 Part 15 Section 15.231 (b)

File #: 46066 Engr.: Clay Allred Date: May 25, 2004 Standard: part 15
Site: 2 Distance: 3 meter Cables: 2.2 Class: B
Bicon: 186 Log: 11 Amp 1: 67

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	HP/ R&S	Meas Type Ave QP Peak	Comments
418.008	82.6	26.2	5.8	17.7	-2.7	79.90	80.3	-0.40	0	1	Hor/	R&S	QP	Run 1.3 Wire Antenna Constont On
418.030	75.5	26.2	5.8	17.6	-2.8	72.70	80.3	-7.60	12	1.1	Vert	R&S	QP	Run 1.3 Wire Antenna Constont On

Data not valid for report unless signed by DNB personnel

1100 E. Chalk Creek Rd.
Coalville, UT, 84017

Phone (435) 336-4433
Fax (435) 336-4436

2.6 Test Results For Radiated Spurious Emissions

2.6.1 Test Data

46066 Colt tech(4/99) DNB Engineering, Inc. Page 1

RADIATED EMISSIONS
CFR 47 Part 15 Section 15.231 (b)

File # 46066 Engr.: Clay Allred Date : May 25, 2004 Standard: part 15
Site : 2 Distance 3 meter Cables 2.2 Class: B
Bicon: 186 Log: 11 Amp 1 : 67

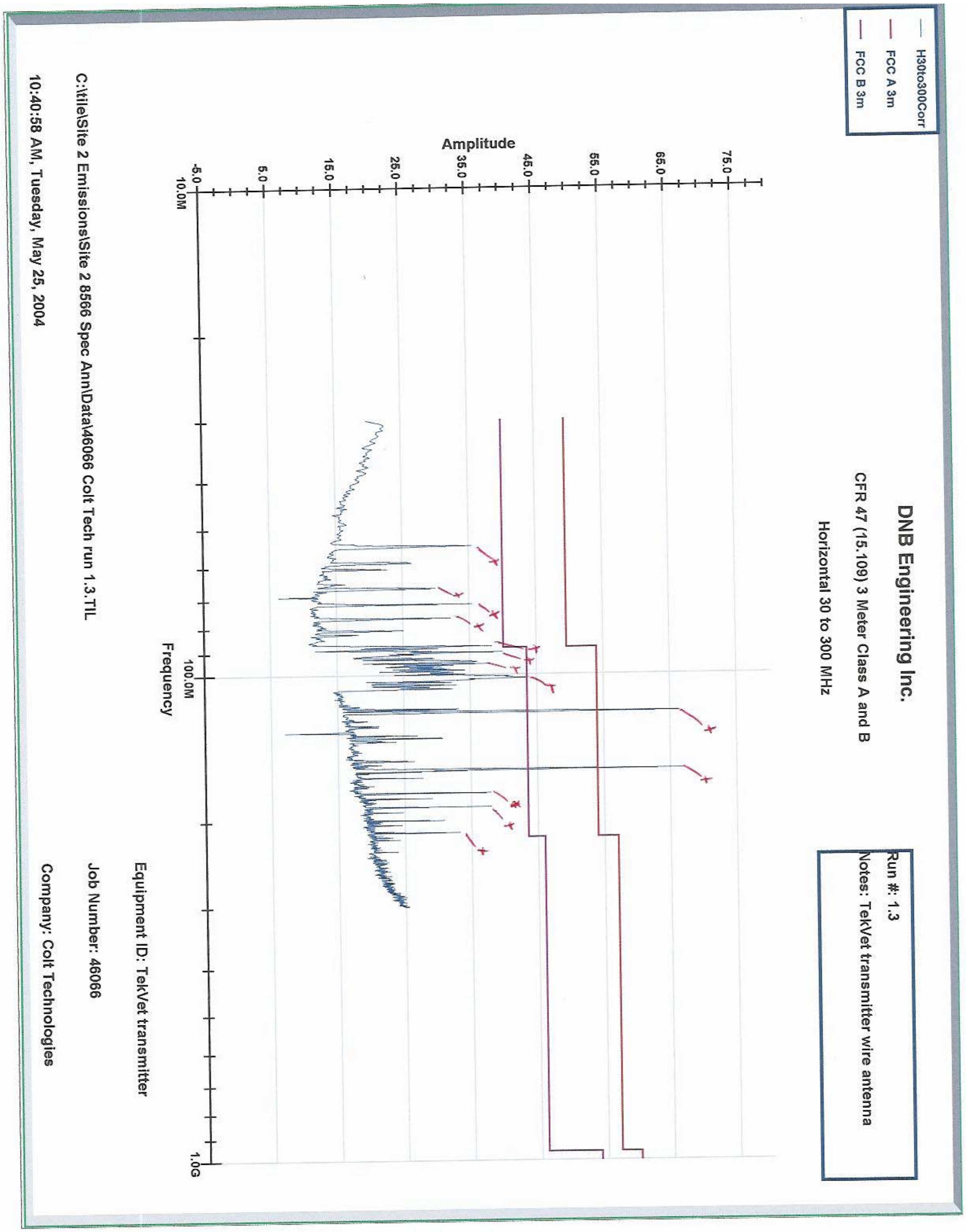
Freq. (MHz)	Meas'd (dBuV)	Amp Factors (dB)	Cable Factors (dB)	Antenna Factors (dB)	Total Factors (dBuV/m)	Total (dBuV/m)	Limit (dBuV/m)	Delta (dB)	Azimuth (degree)	Height (m)	Hor/ Vert	HP/ R&S	Meas Type Ave QP Peak	Comments
836.025	37.0	26.7	8.7	24.0	6.0	43.00	46.0	-3.00	0	1	Hor/	R&S	QP	Run 1.3 Wire Antenna Constont On
836.037	33.2	26.7	8.7	23.4	5.4	38.60	46.0	-7.40	139	1.25	Vert	R&S	QP	Run 1.3 Wire Antenna Constont On
117.918	26.3	26.0	3.0	12.1	-10.9	15.40	43.5	-28.10	0	1	Vert	R&S	QP	Run 1.3 Wire Antenna Constont On
70.020	24.6	26.2	2.4	5.9	-17.9	6.70	40.0	-33.30		1	Vert	R&S	QP	Run 1.3 Wire Antenna Constont On

Data not valid for report unless signed by DNB personnel

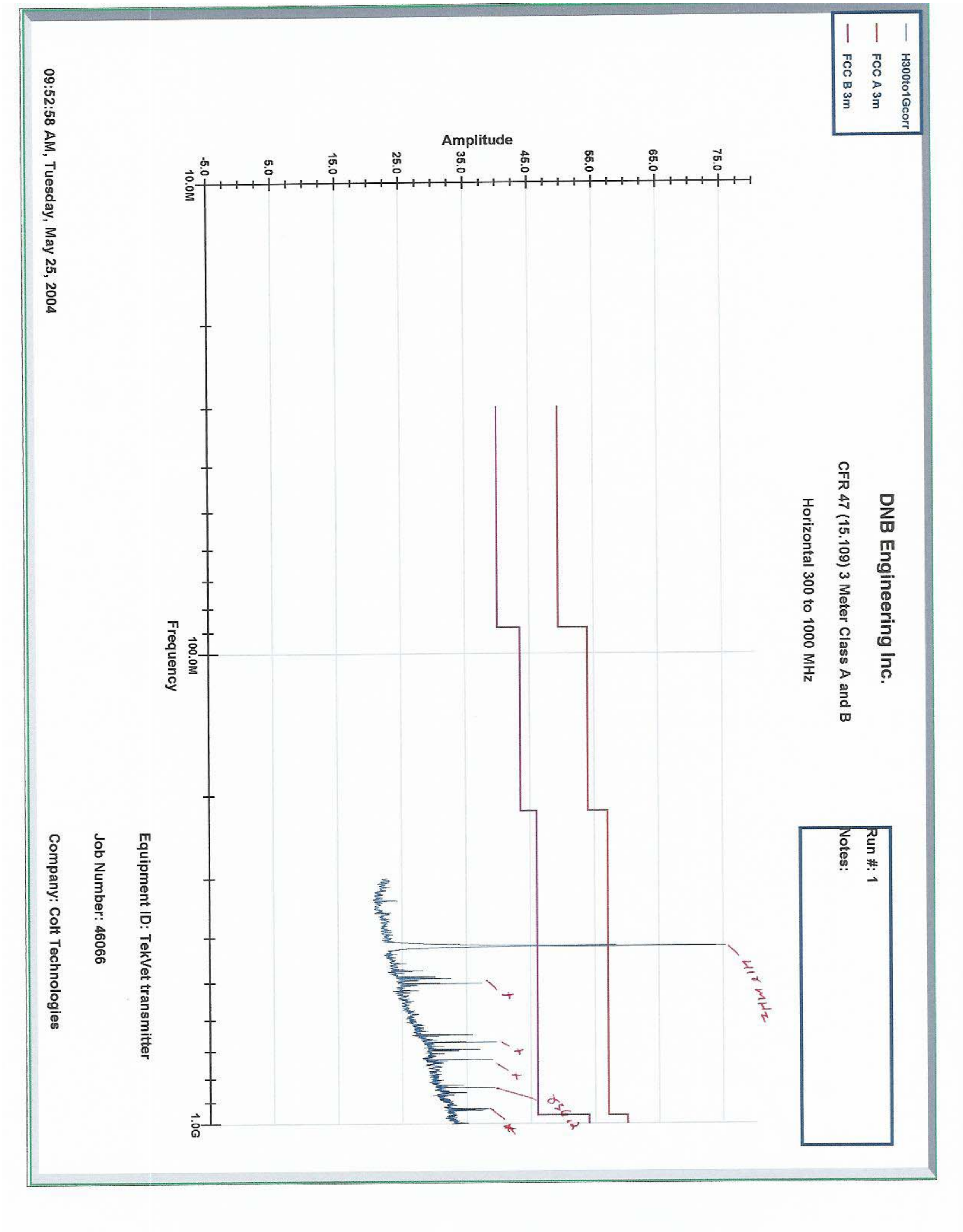
1100 E. Chalk Creek Rd.
Coalville, UT, 84017

Phone (435) 336-4433
Fax (435) 336-4436

2.6.2 (Horizontal plot 30 to 300 MHz)

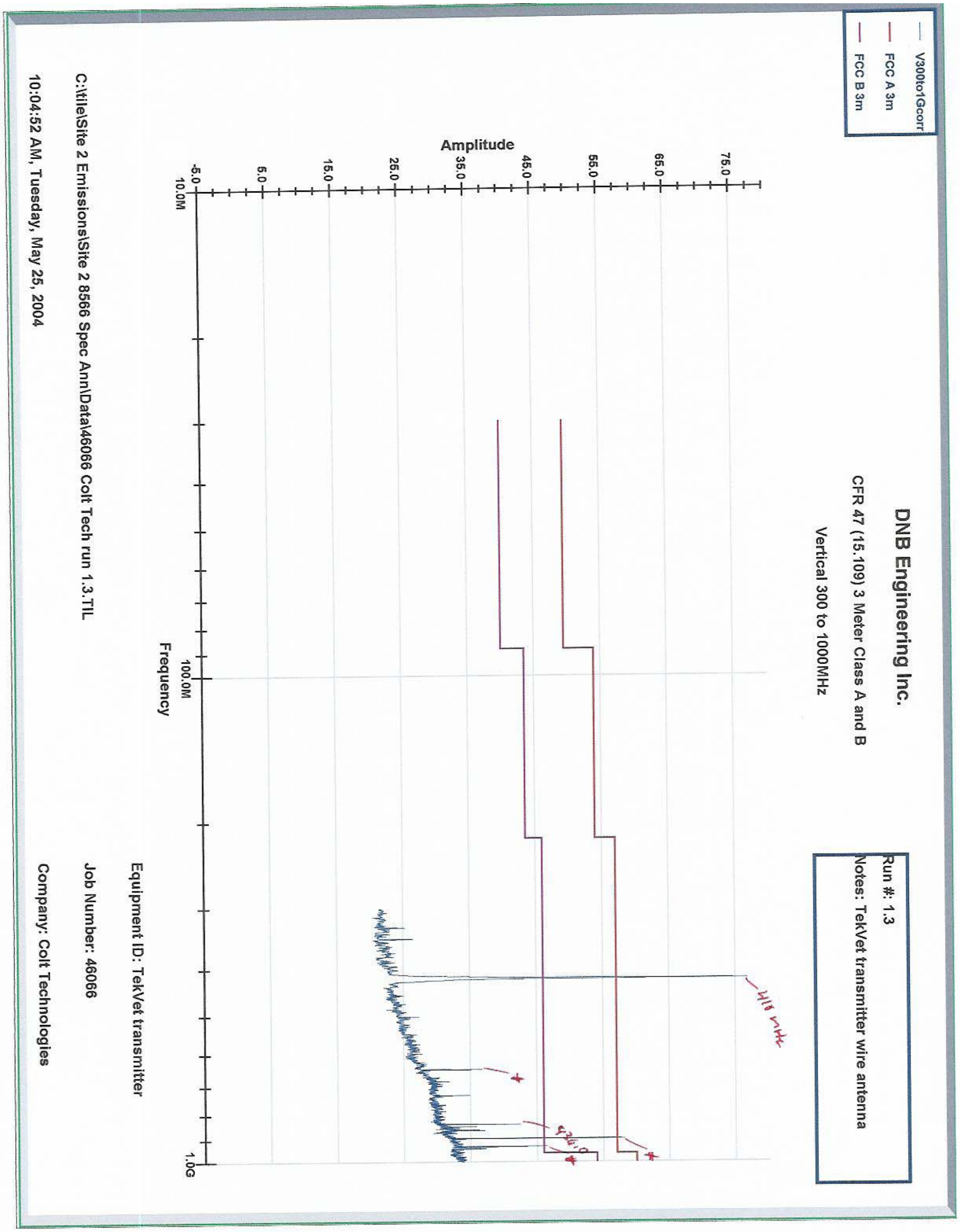


2.6.3 (Horizontal Plot 300 to 1000 MHz)

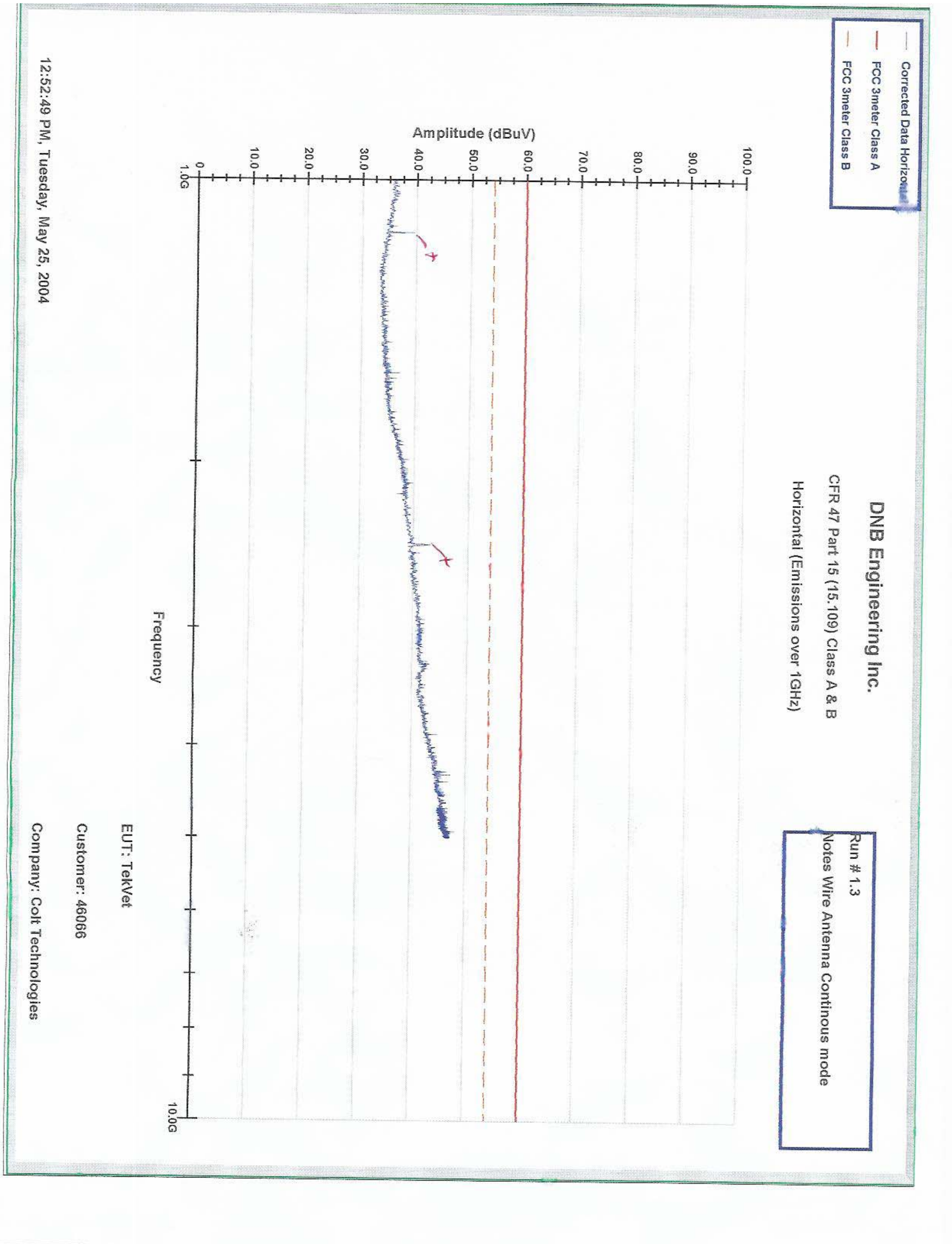


2.6.4 (Vertical Plot 30 to 300 MHz)

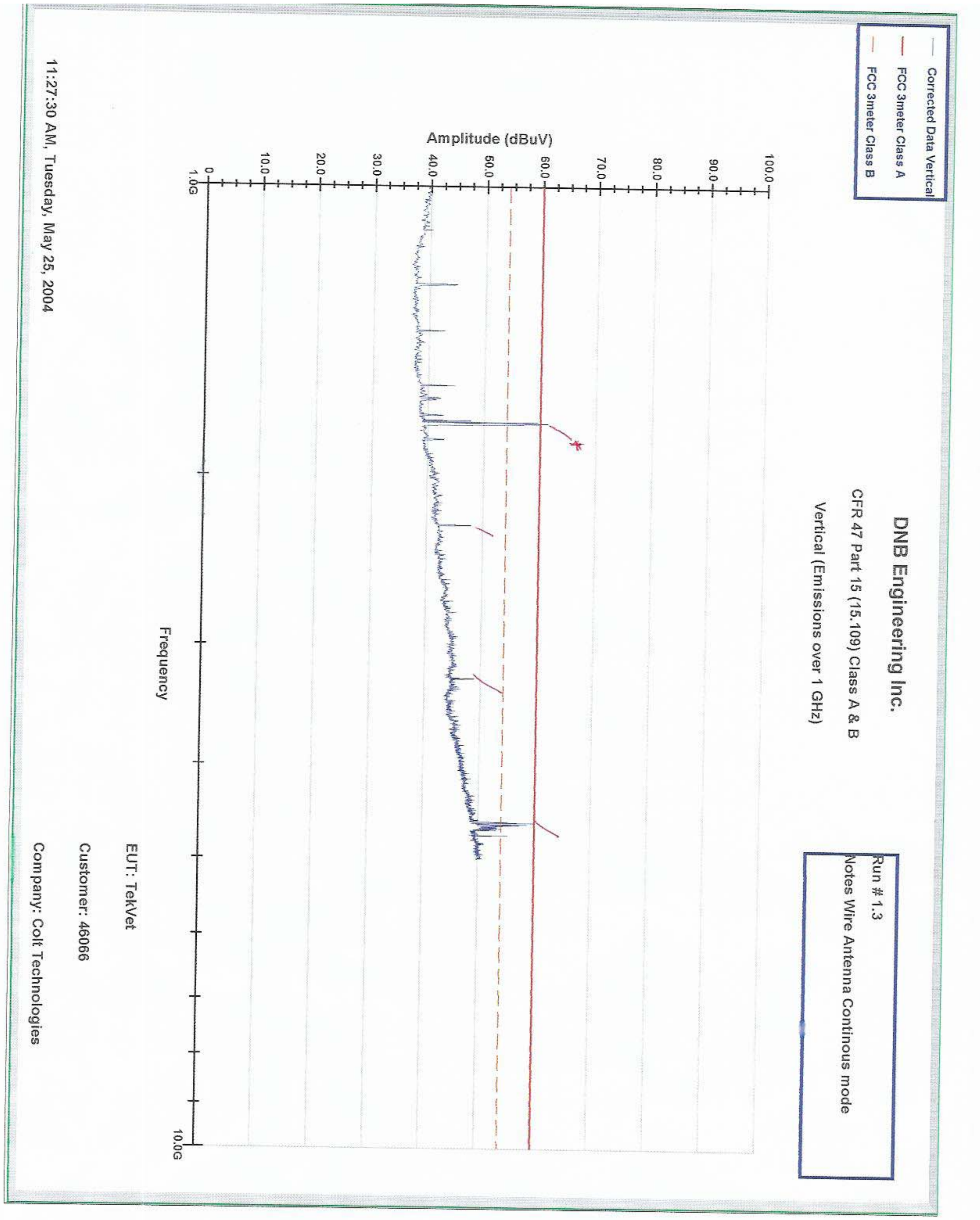
2.6.5 (Vertical Plot 300 to 1000 MHz)



2.6.6 (Horizontal Plot of Emissions over 1GHz)

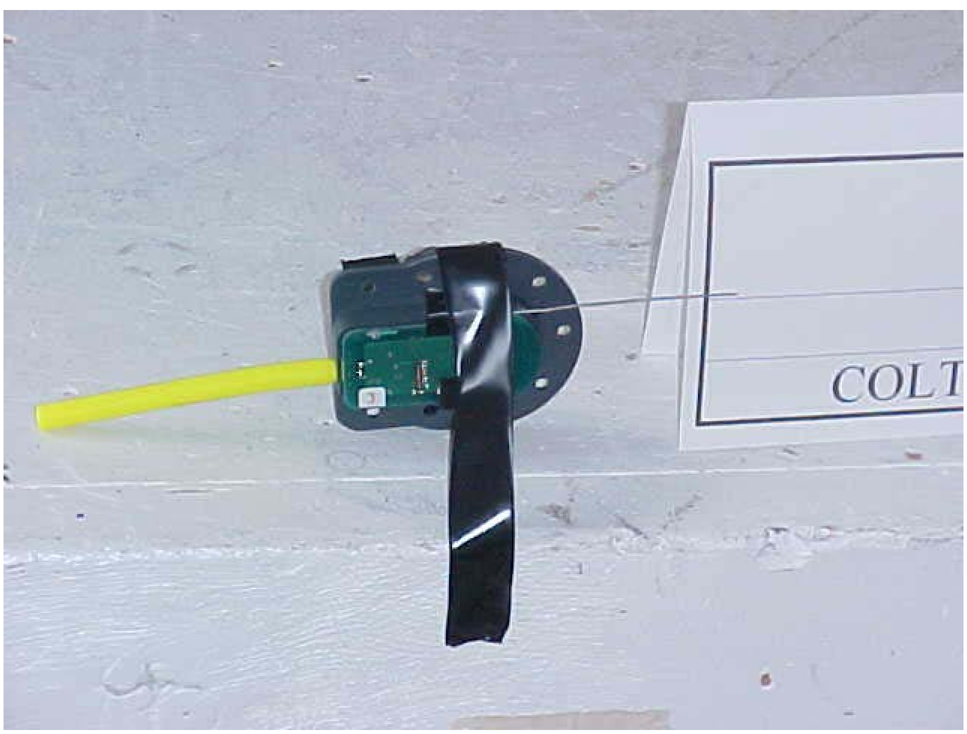


2.6.7 (Vertical Plot of Emissions over 1GHz)



2.7 Photograph of Test Setup – Radiated Emissions

EUT: TEKVET
View: Test Setups

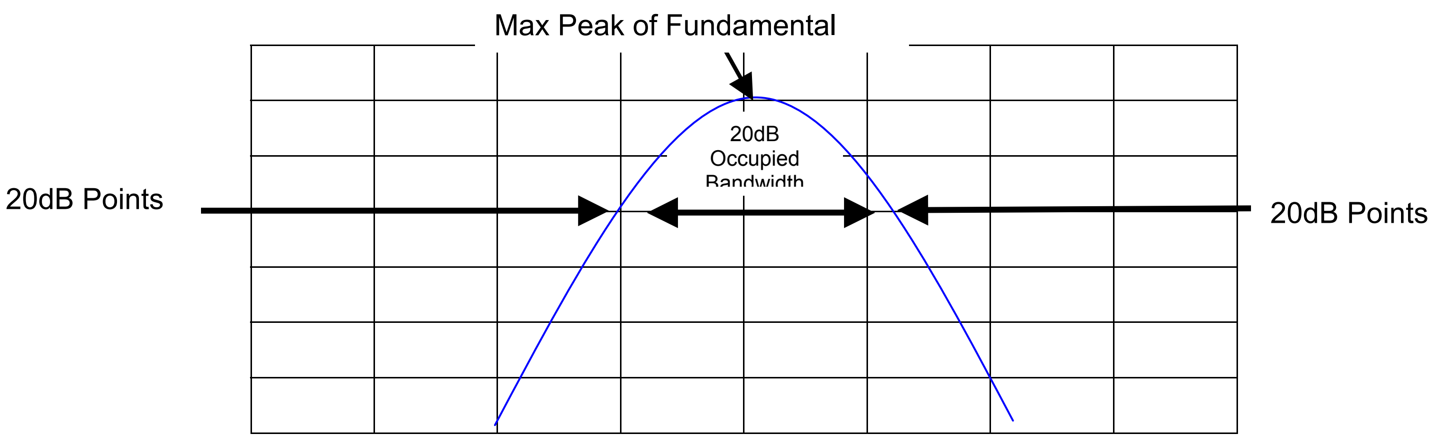


3. OCCUPIED BANDWIDTH – PER ANSI C63.4 ANNEX I.6

3.1 Test Setup and Procedure

The Test Site and EUT were set up as described in section 2.1 of this document. The EUT is put into the operational test mode as stated in Section 1.4 and then started. The spectrum analyzer had its self-calibration performed, and then set to the frequency to be tested, with a bandwidth of 10kHz as per ANSI C63.4 Annex I.6 paragraph b. The Max Peak of the Fundamental Frequency was noted, and the points 20 dB dB below the Fundamental Max Peak, for both sides of the signal was noted, and the frequency difference between these points was recorded as the occupied bandwidth. See below for example.

Example Of Occupied Bandwidth Measurement



Instrumentation Bandwidth set as described in ANSI C63.4 Annex I.6

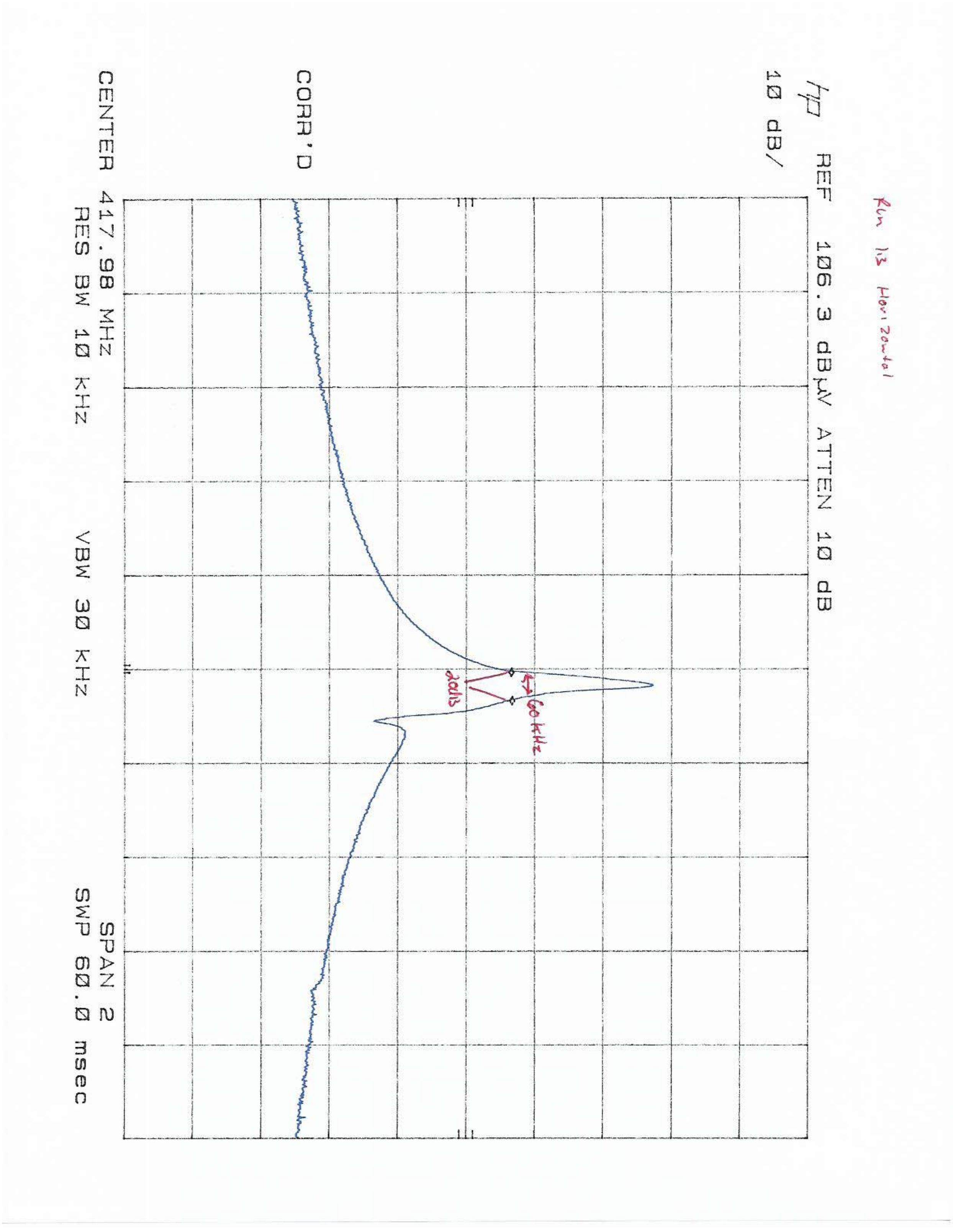
3.2 Occupied Bandwidth Test Data.

Frequency (MHz)	Measured Bandwidth	Bellow Fundamental	Instrument Bandwidth	Antenna Polarity	Required Occupied Bandwidth	Result	Comments
418	60 kHz	20dB	10kHz	Horizontal	1.045 MHz	Pass	
418	60 kHz	20dB	10kHz	Vertical l	1.045 MHz	Pass	

Refer to section 3.3 for Test Data

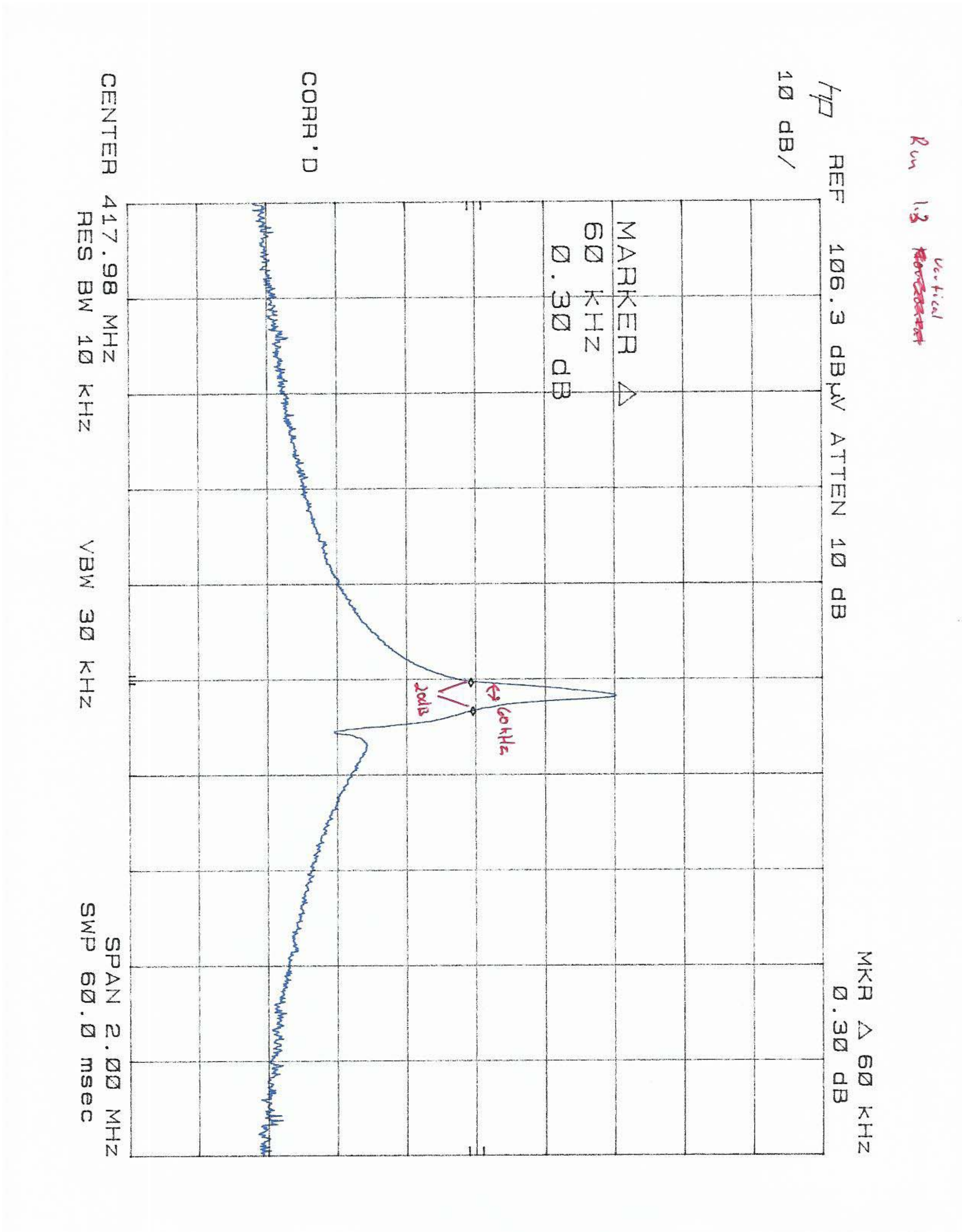
3.3 Occupied Bandwidth

Run 1.3 Horizontal



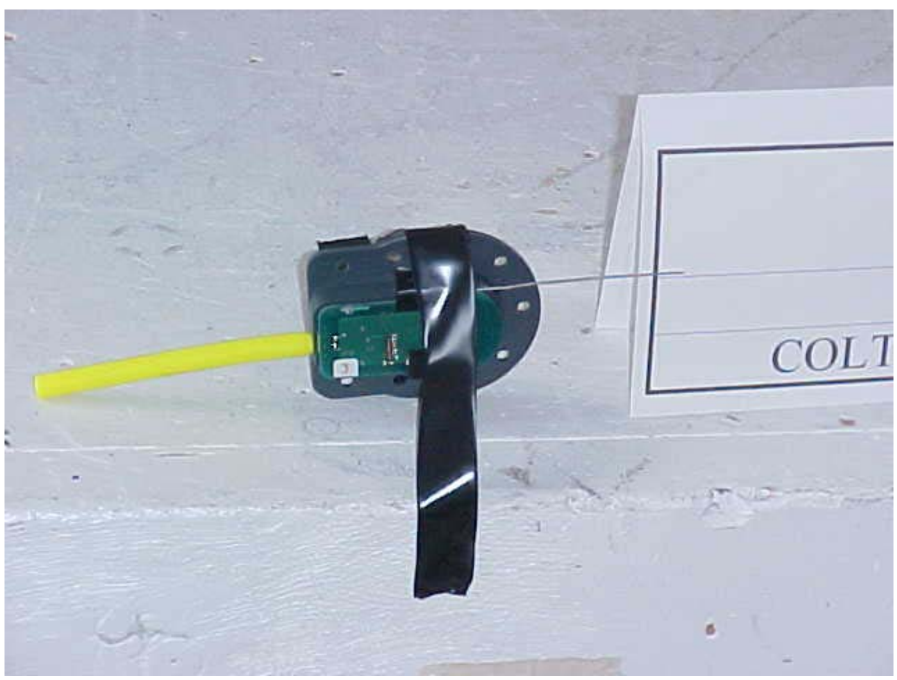
3.4 Occupied Bandwidth

Run 1.3Vertical



3.5 Photograph of Test Setup – Radiated Emissions

EUT: TEKVET
View: Test Setups



4. LABELING INFORMATION

Transmitter Package Label:

1. Permanently attached adhesive backed Mylar label located on back of transmitter package.
2. Font: Times New Roman, bold, 8pt.

Colt Technologies
Model: TV-T-1A
FCC ID: XXXCTTVT1

5. OWNERS MANUAL

Attaching and Activating the TekVet Transmitter:

Note : The TekVet Transmitter will be attached to the animal's **left** ear.

1. Put the animal in a Squeeze Shoot with its head restrained and pulled to the right, fully exposing the left ear .

2. Holding the TekVet Transmitter by the case, insert the temperature probe into the animal's ear. It must extend into the ear cannel at least three inches. This is an important step since the accuracy of the temperature reading depends on correct temperature probe placement.

3. While holding the transmitter against the ear, insert the retaining pins through the back of the ear into the holes in the transmitter case using the tagging tool.

4. The transmitter's antenna should extend toward the outer ear and be approximately parallel (level) with the ground.

5. Activate the transmitter by holding the magnetic activation tool against the round "bulls eye" on the TekVet Transmitter case for four to seven seconds.

6. When activated, the TekVet Transmitter will transmit 10 times at 10 second intervals to initialized the receiver network and indicate correct operation. It then goes into normal operation.

Removing and Disabling the TekVet Transmitter:

1. Clip off the TekVek Transmitter ear attachment pins and remove the transmitter from the animal.

2. Attach the deactivation magnet to the "bulls eye" of the TekVet transmitter and leave it there.. This will permanently disable it.

3. All transmitters must be returned to Colt Technologies or designated representative for proper disposal.

Caution: The Lithium Battery powering the TekVet transmitter requires proper disposal. Do not attempt to burn the transmitter or open it. Do not dispose of the transmitter in a landfill.

The device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

6. APPENDIX SECTION

6.1 APPENDIX A: 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 uncertainties and an additional allowable 1 dB for site imperfections.

6.2 APPENDIX B: 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.

6.2.1 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.

6.2.2 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

Thomas W Phillips
Electronics Engineer

6.2.3 NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC 17025:1999
ISO 9002:1994

Certificate of Accreditation

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, 2004
Effective through

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

NVLAP-01C (06-01)

6.2.4 NVLAP Accreditation

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

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

Revised Scope 10/23/2003 **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, 2004
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

Revised Scope 10/23/2003 **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) and EN 61000-3-2 (2000) : Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A)
12/EM03b	IEC 61000-3-3 (2002-03), edition 1.1: Electomagnetic compatibility (EMC) - Part 3-3: Limits - Limitations of voltage changes, voltage flucuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional
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 (2002) and EN 61000-4-3: Radiated Radio-Frequency Electromagnetic Field Immunity Test

June 30, 2004
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

Revised Scope 10/23/2003 **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 (1995) + Amd. 1 (2000) and EN 61000-4-5: Surge Immunity Test
12/I05	IEC 61000-4-6, Edition 2.0 (2003) 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 (1994) + Amd. 1 (2000) 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
12/60601c	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

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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
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Scope of Accreditation

Revised Scope 10/23/2003 **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, 2004
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

6.2.5 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

6.3 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	23MARR05
Amplifier	HP/8447D	U-065	2727A06180	23MARR05
Amplifier	HP/8447D	U-066	2727A06181	23MARR05
Amplifier	HP/8447D	U-068	2727A06184	23MARR05
Bicon Antenna	SCH/BBA9106	U-187	6	20AUG04
Bicon Antenna	SCH/BBA9106	U-186	7	26JUN04
Log P Antenna	SCH/UJALP9107	U-011	11	26JUN04
Log P Antenna	SCH/UHAL09107	U-010	10	20AUG04
Loop Antenna	R&S/HFH 2-Z2	U-016	880665/-40	22JUL04
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 # 46066F