



**FCC & Industry Canada Certification
Test Report
for
NBB Controls & Components AG
FCC ID: SJ7TJOY96
IC ID: 2634B-TJOY96**

April 28, 2005

Prepared for:

**NBB Controls & Components AG
Otto-Hahn-Straße 1-3
D-75248 Ölbronn-Dürrn**

Prepared By:

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**FCC & Industry Canada Certification Test Report
for the
NBB Controls & Components AG
Nano-L-A1 Industrial Remote Control
FCC ID: SJ7TJOY96
IC ID: 2634B-TJOY96**

April 28, 2005

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Abstract

This report has been prepared on behalf of NBB Controls & Components AG to support the attached Application for Equipment Authorization. The test report and application are submitted for a Periodic Intentional Radiator under Part 15.231 of the FCC Rules and Regulations and Spectrum Management and Telecommunications Policy RSS-210 of Industry Canada. This Federal Communication Commission (FCC) Certification Test Report documents the test configuration and test results for a NBB Controls & Components AG Nano-L-A1 Industrial Remote Control.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The Industry Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

The NBB Controls & Components AG Nano-L-A1 Industrial Remote Control complies with the limits for a Periodic Intentional Radiator device under FCC Part 15.231 and Industry Canada RSS-210.

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1 Introduction

1.1 Compliance Statement

The NBB Controls & Components AG Nano-L-A1 Industrial Remote Control complies with the limits for a Periodic Intentional Radiator device under FCC Part 15.231 and Industry Canada RSS-210.

1.2 Test Scope

Tests for radiated emissions were performed. All measurements were performed according to the 2003 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

Customer: NBB Controls & Components AG
Otto-Hahn-Straße 1-3
D-75248 Ölbronn-Dürrn

Quotation Number: 61756

1.4 Test Dates

Testing was performed from January 7, 2005 to April 4, 2005.

1.5 Test and Support Personnel

Washington Laboratories, LTD	Greg Snyder, James Ritter
Client Representative	Thomas Burchard

2 Equipment Under Test

2.1 EUT Identification & Description

NBB Controls & Components AG Nano-L-A1 is a portable Industrial Remote Control device used for control and E-Stop of cranes used on industrial and construction sites. The Nano-L is powered via two internal 7.2 Volt batteries.

Table 1. Device Summary

ITEM	DESCRIPTION
Manufacturer:	NBB Controls & Components AG
FCC ID Number	SJ7TJOY96
Industry Canada Number	2634B-TJOY96
EUT Name:	Industrial Remote Control
Model:	Nano-L-A1
FCC Rule Parts:	§15.231
IC Rule Parts:	RSS-210
Frequency Range:	433.1 - 434.75MHz
Maximum Output Power:	NA
Modulation:	FM
Occupied Bandwidth:	19.5 kHz
Keying:	Manual
Type of Information:	Control
Number of Channels:	67
Antenna Type	Integral
Interface Cables:	None
Power Source & Voltage:	7.2Vdc

2.2 Test Configuration

The Nano-L-A1 was tested in a stand-alone configuration.

2.3 Testing Algorithm

The Nano-L-A1 was tested in a continuous transmits operation.

Worst case emission levels are provided in the test results data.

2.4 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. The Industry Canada OATS numbers are 3035A-1 and 3035A-2 for Washington Laboratories, Ltd. Site 1 and Site 2, respectively. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

2.5 Measurements

2.5.1 References

ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Land Mobile FM or PM Communications Equipment Measurement and Performance Standards (ANSI/TIA/EIA-603-93)

2.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ± 2.3 dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:

A = Antenna calibration uncertainty, in dB = 2 dB

B = Spectrum Analyzer uncertainty, in dB = 1 dB

C = Site uncertainty, in dB = 4 dB

n = number of factors in uncertainty calculation = 3

Thus, Total Uncertainty = $0.5 (2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3$ dB.

3 Test Equipment

Table 2 shows a list of the test equipment used for measurements along with the calibration information.

Table 2: Test Equipment List

Site 1 List:

Equipment	WLL Asset #	Calibration Due
Sunol JB1 Biconilog Antenna	0382	1/06/06
ARA DRG118/A Microwave Horn Antenna	0425	4/17/05
Hewlett-Packard 8568B Spectrum Analyzer	0072	7/01/05
Hewlett-Packard 85650A Quasi-Peak Adapter	0069	7/08/05
Hewlett-Packard 85685A RF Preselector	0070	7/06/05
Hewlett-Packard 8593A Spectrum Analyzer	0074	8/17/05
Hewlett-Packard 8449B Microwave Preamp	0312	9/29/05

4 Test Results

4.1 Transmission Cessation from Time-of-Release

FCC Part 15.231 states that a periodic intentional radiator shall cease transmission within a five second period from release of automatic or manual keying of operation.

Testing was conducted to verify that the Nano-L-A1 Industrial Remote Control stopped transmitting within the required time period. A 6 second sweep was made, during which the control toggle was activated and released, and the time to transmission end was measured. Figure 1 shows the indicated time period from un-keying the device until cessation of transmission. The EUT complies with the requirements for this section.

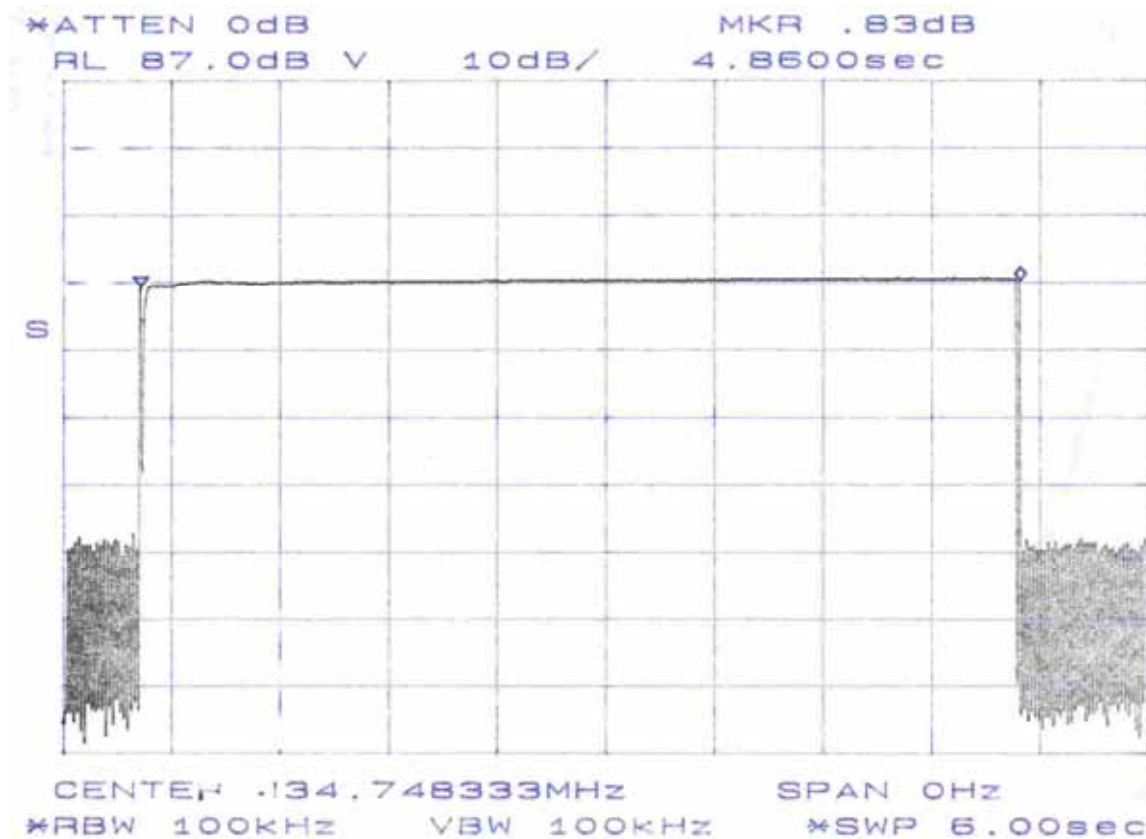


Figure 1. Time Period: Release to Termination of Transmission

4.2 Occupied Bandwidth: (FCC Part §2.1049)

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer.

FCC Part 15.231 states that the 20 dB bandwidth of the modulated carrier shall be as follows:

Frequency Range (MHz)	Occupied Bandwidth Limit
70-900 MHz	0.25%
>900 MHz	0.5%

At full modulation, the occupied bandwidth was measured as shown:

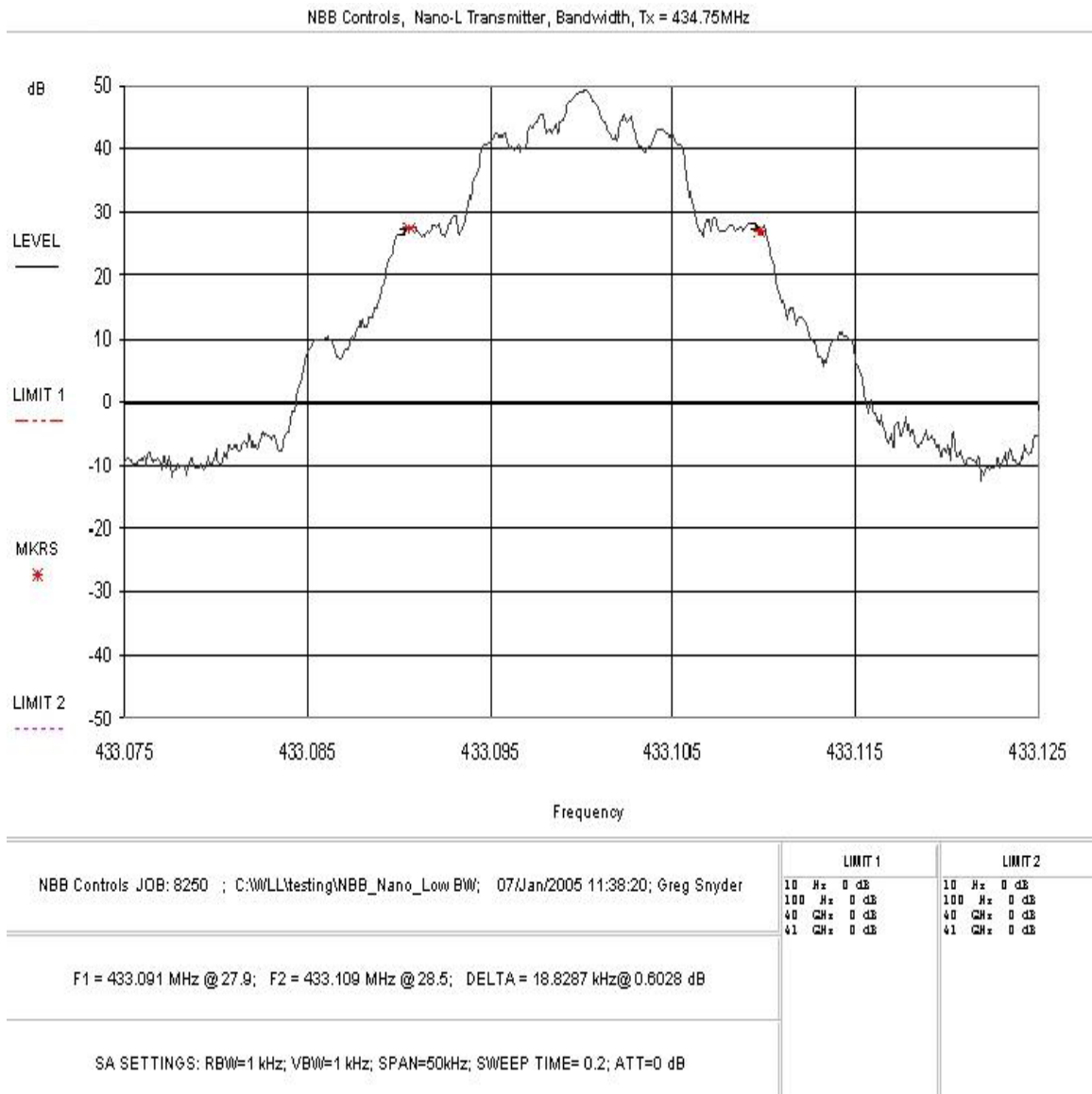


Figure 2. Occupied Bandwidth, Low Channel

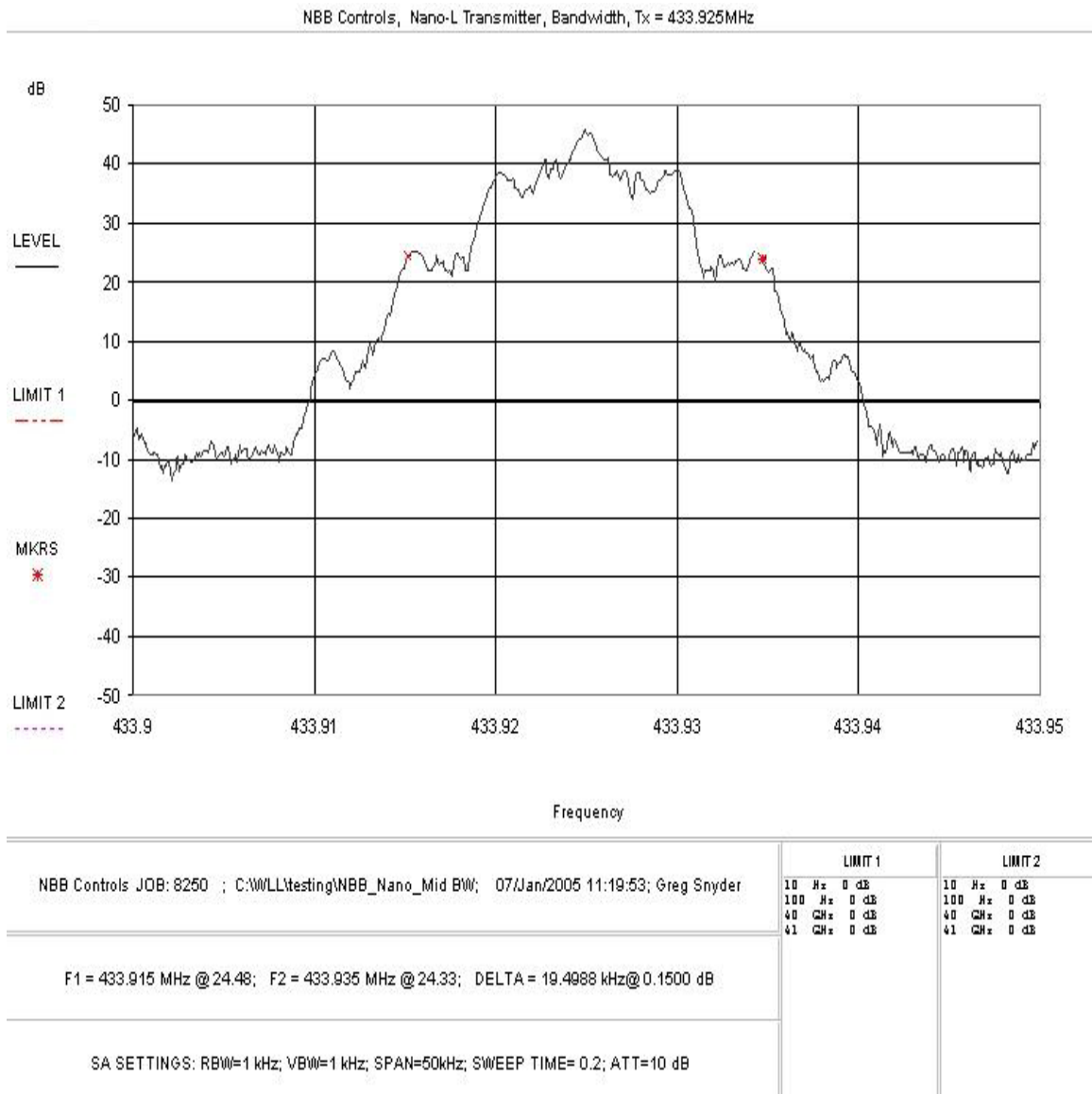


Figure 3. Occupied Bandwidth, Mid Channel

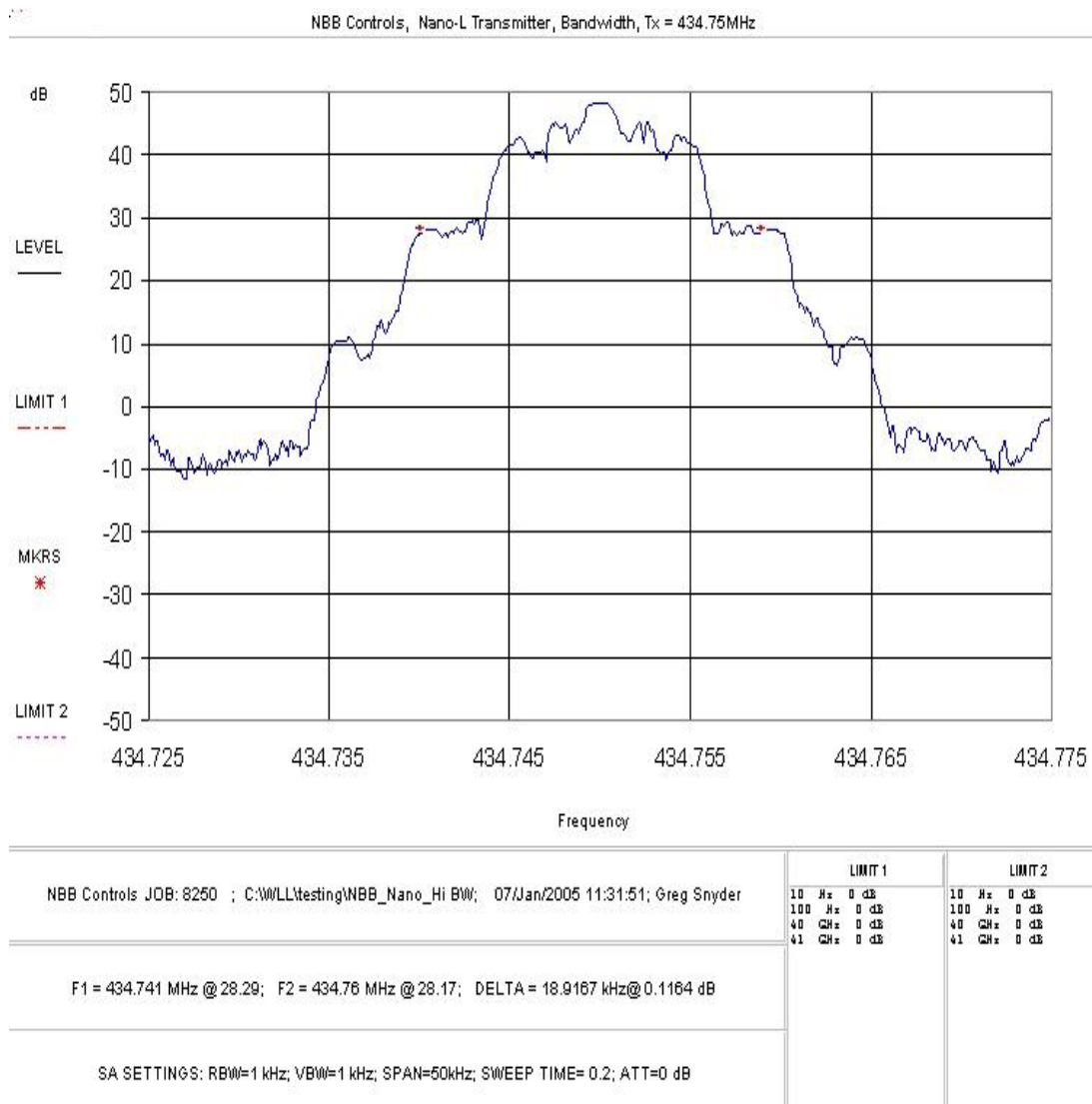


Figure 4. Occupied Bandwidth, High Channel

Table 3 provides a summary of the Occupied Bandwidth Results.

Table 3. Occupied Bandwidth Results

Frequency	Bandwidth	Limit	Pass/Fail
Low Channel: 433.1MHz	18.828kHz	1.082 MHz	Pass
Mid Channel: 433.925MHz	19.498kHz	1.084 MHz	Pass
High Channel: 434.75MHz	18.916kHz	1.086 MHz	Pass

4.3 Radiated Spurious Emissions

The EUT must comply with requirements for radiated spurious emissions per the limits given in §15.231(a). In addition, any emissions appearing in the restricted bands listed in §15.205 must comply with the general emission limits of 15.209.

4.3.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. Both the horizontal and vertical field components were measured.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	100kHz	>100kHz
>1000 MHz	1 MHz	1MHz (peak) 10Hz (Avg)

Emissions were measured to the 10th harmonic of the transmit frequency. The Nano-L controller was tested in three orthogonal planes. Worst case emission levels are reported.

The following is a sample calculation used in the data tables for calculating the final field strength of spurious emissions and comparing these levels to the specified limits.

Sample Calculation:

Spectrum Analyzer Voltage (SA Level): V dBμV (Peak)

Antenna Factor (Ant Corr): AFdB/m

Cable Loss Correction (Cable Corr): CCdB

Amplifier Gain: GdB

Electric Field (Corr Level): EdBμV/m = VdBμV + AFdB/m + CCdB +
DCCdB - GdB

Table 4. Radiated Emissions Test Data, Low Channel, Peak Data

CLIENT:	NBB Controls	DATE:	4/1/2005
TESTER:	James Ritter	JOB #:	8520
<u>EUT Information:</u>		<u>Test Requirements:</u>	
EUT:	Nano-L	TEST STANDARD:	FCC Part 15.231
CONFIGURATION:	Transmit @chan 1	DISTANCE:	3m
CLOCKS:	12.5 MHz	CLASS:	B
<u>Low Frequency Test Equipment/Limit:</u>		<u>High Frequency Test Equipment/Limit:</u>	
ANTENNA:	A_00007	ANTENNA:	A_00425
CABLE:	CSITE2_3m	CABLE:	CSITE2_HF
LIMIT:	LFCC_3m_Class_B	AMPLIFIER:	A_00066
TX Frequency	433.1		

Frequency	Pol	Azimuth	Ant. Height	SA Level	Ant. Corr.	Cable Corr.	Amp	Corr. Level	Corr. Level	Limit	Margin
(MHz)	H/V	Degree	(m)	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(uV/m)	(uV/m)	dB
				Peak							
433.10	V	90.0	1.0	50.3	15.4	3.0	0.0	68.8	2741.3	109625.0	-32.0
866.20	V	125.0	2.1	13.4	20.3	4.4	0.0	38.1	80.2	10962.5	-42.7
1299.30	V	180.0	1.0	43.4	26.6	2.0	36.1	36.0	62.9	10962.5	-44.8
1732.40	V	125.0	1.0	44.1	28.4	2.9	35.7	39.7	96.8	10962.5	-41.1
2165.50	V	290.0	1.0	47.0	29.5	3.3	35.5	44.3	163.6	10962.5	-36.5
2598.60	V	90.0	1.0	54.0	30.2	3.0	35.6	51.5	377.6	10962.5	-29.3
3031.70	V	90.0	1.0	44.8	30.7	2.8	35.7	42.6	134.6	10962.5	-38.2
3464.80	V	125.0	1.0	46.5	31.0	2.8	35.5	44.7	171.2	10962.5	-36.1
3897.90	V	125.0	1.0	47.1	31.2	2.8	35.4	45.6	190.9	5000.0	-28.4
4331.00	V	125.0	1.0	47.8	32.1	3.4	35.6	47.7	241.5	5000.0	-26.3
433.10	H	200.0	2.5	58.0	15.4	3.0	0.0	76.5	6652.0	109625.0	-24.3
866.20	H	170.0	3.0	14.8	20.3	4.4	0.0	39.5	94.3	10962.5	-41.3
1299.30	H	220.0	1.0	46.7	26.6	2.0	36.1	39.2	91.1	10962.5	-41.6
1732.40	H	180.0	1.0	44.6	28.4	2.9	35.7	40.2	102.6	10962.5	-40.6
2165.50	H	100.0	1.0	48.6	29.5	3.3	35.5	45.9	196.7	10962.5	-34.9
2598.60	H	120.0	1.0	50.1	30.2	3.0	35.6	47.6	241.0	10962.5	-33.2
3031.70	H	165.0	1.0	43.8	30.7	2.8	35.7	41.6	120.0	10962.5	-39.2
3464.80	H	180.0	1.0	45.9	31.0	2.8	35.5	44.1	159.8	10962.5	-36.7
3897.90	H	125.0	1.0	46.9	31.2	2.8	35.4	45.4	186.5	5000.0	-28.6
4331.00	H	125.0	1.0	48.0	32.1	3.4	35.6	47.9	247.7	5000.0	-26.1
36.80	V	0.0	1.0	14.2	16.4	1.2	0.0	31.8	38.8	100.0	-8.2
115.19	V	90.0	1.2	8.6	10.9	1.7	0.0	21.2	11.5	150.0	-22.3
166.38	V	270.0	1.3	4.0	9.5	2.0	0.0	15.6	6.0	150.0	-28.0
193.25	V	270.0	1.2	6.4	9.5	2.2	0.0	18.1	8.0	150.0	-25.4
230.37	V	90.0	2.0	6.8	11.7	2.4	0.0	20.9	11.1	200.0	-25.1
281.57	V	270.0	1.5	5.6	12.4	2.5	0.0	20.6	10.7	200.0	-25.4
332.76	V	90.0	1.6	14.3	13.6	2.7	0.0	30.5	33.7	200.0	-15.5
358.35	V	90.0	1.5	11.3	14.1	2.8	0.0	28.2	25.8	200.0	-17.8
435.17	V	270.0	1.6	9.8	15.4	3.1	0.0	28.3	26.1	200.0	-17.7
499.13	V	90.0	2.0	8.4	16.6	3.2	0.0	28.2	25.8	200.0	-17.8

Frequency (MHz)	Pol H/V	Azimuth Degree	Ant. Height (m)	SA Level (dBuV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp (dB)	Corr. Level (dBuV/m)	Corr. Level (uV/m)	Limit (uV/m)	Margin dB
652.73	V	270.0	2.0	13.1	18.9	3.8	0.0	35.9	62.1	200.0	-10.2
716.70	V	270.0	2.0	11.7	19.9	3.9	0.0	35.4	59.2	200.0	-10.6
831.90	V	180.0	1.4	5.6	20.7	4.2	0.0	30.5	33.7	200.0	-15.5
1651.25	V	180.0	1.0	42.5	28.1	2.8	0.0	37.6	75.7	500.0	-16.4
1830.26	V	190.0	1.0	41.3	28.7	3.1	0.0	37.5	75.3	500.0	-16.4
3609.75	V	170.0	1.0	40.8	31.0	2.8	0.0	39.1	89.8	500.0	-14.9
36.80	V	190.0	3.5	5.2	16.4	1.2	0.0	22.8	13.8	100.0	-17.2
115.19	H	270.0	3.0	8.8	10.9	1.7	0.0	21.4	11.8	150.0	-22.1
166.38	H	270.0	2.6	11.0	9.5	2.0	0.0	22.6	13.4	150.0	-21.0
193.25	H	0.0	3.0	10.4	9.5	2.2	0.0	22.1	12.7	150.0	-21.4
230.37	H	190.0	2.4	11.5	11.7	2.4	0.0	25.6	19.0	200.0	-20.4
281.57	H	170.0	1.0	10.7	12.4	2.5	0.0	25.7	19.2	200.0	-20.3
332.76	H	190.0	1.2	17.8	13.6	2.7	0.0	34.0	50.4	200.0	-12.0
358.35	H	170.0	1.1	17.5	14.1	2.8	0.0	34.4	52.6	200.0	-11.6
435.17	H	0.0	1.0	9.5	15.4	3.1	0.0	28.0	25.2	200.0	-18.0
499.13	H	45.0	1.0	10.4	16.6	3.2	0.0	30.2	32.5	200.0	-15.8
652.73	H	180.0	1.5	11.8	18.9	3.8	0.0	34.6	53.4	200.0	-11.5
716.70	H	180.0	1.2	15.0	19.9	3.9	0.0	38.7	86.5	200.0	-7.3
831.90	H	190.0	1.3	7.5	20.7	4.2	0.0	32.4	41.9	200.0	-13.6
1651.25	H	165.0	1.0	38.0	28.1	2.8	0.0	33.1	45.2	500.0	-20.9
1830.26	H	180.0	1.0	36.7	28.7	3.1	0.0	32.9	44.0	500.0	-21.1
3609.75	H	270.0	1.0	37.8	31.0	2.8	0.0	36.1	63.8	500.0	-17.9

Table 5. Radiated Emissions Test Data, Low Channel, Average Data

CLIENT:	NBB Controls	DATE:	4/1/2005
TESTER:	James Ritter	JOB #:	8520
<u>EUT Information:</u>		<u>Test Requirements:</u>	
EUT:	Nano-L	TEST STANDARD:	FCC Part 15.231
CONFIGURATION:	Transmit @chan 1	DISTANCE:	3m
CLOCKS:	12.5 MHz	CLASS:	B
<u>Low Frequency Test Equipment/Limit:</u>		<u>High Frequency Test Equipment/Limit:</u>	
ANTENNA:	A_00007	ANTENNA:	A_00425
CABLE:	CSITE2_3m	CABLE:	CSITE2_HF
LIMIT:	LFCC_3m_Class_B	AMPLIFIER:	A_00066
TX Frequency	433.1		

Frequency (MHz)	Pol H/V	Azimuth Degree	Ant. Height (m)	SA Level (dBuV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp (dB)	Corr. Level (dBuV/m)	Corr. Level (uV/m)	Limit (uV/m)	Margin dB
				Avg.							
433.10	V	90.0	1.0	50.0	15.4	3.0	0.0	68.5	2648.2	10962.5	-12.3
866.20	V	125.0	2.1	11.5	20.3	4.4	0.0	36.2	64.5	1096.3	-24.6
1299.30	V	180.0	1.0	34.6	26.6	2.0	36.1	27.1	22.7	1096.3	-33.7
1732.40	V	125.0	1.0	33.0	28.4	2.9	35.7	28.6	27.0	1096.3	-32.2
2165.50	V	290.0	1.0	38.7	29.5	3.3	35.5	36.0	62.9	1096.3	-24.8
2598.60	V	90.0	1.0	36.0	30.2	3.0	35.6	33.5	47.5	1096.3	-27.3
3031.70	V	90.0	1.0	33.8	30.7	2.8	35.7	31.6	37.9	1096.3	-29.2
3464.80	V	125.0	1.0	38.1	31.0	2.8	35.5	36.3	65.0	1096.3	-24.5
3897.90	V	125.0	1.0	38.6	31.2	2.8	35.4	37.1	72.0	500.0	-16.8
4331.00	V	125.0	1.0	43.2	32.1	3.4	35.6	43.1	142.5	500.0	-10.9
433.10	H	200.0	2.5	57.8	15.4	3.0	0.0	76.3	6500.6	10962.5	-4.5
866.20	H	170.0	3.0	12.8	20.3	4.4	0.0	37.5	74.9	1096.3	-23.3
1299.30	H	220.0	1.0	36.1	26.6	2.0	36.1	28.6	27.0	1096.3	-32.2
1732.40	H	180.0	1.0	34.7	28.4	2.9	35.7	30.3	32.8	1096.3	-30.5
2165.50	H	100.0	1.0	38.5	29.5	3.3	35.5	35.8	61.5	1096.3	-25.0
2598.60	H	120.0	1.0	36.0	30.2	3.0	35.6	33.5	47.5	1096.3	-27.3
3031.70	H	165.0	1.0	33.4	30.7	2.8	35.7	31.2	36.2	1096.3	-29.6
3464.80	H	180.0	1.0	35.8	31.0	2.8	35.5	34.0	49.9	1096.3	-26.8
3897.90	H	125.0	1.0	38.0	31.2	2.8	35.4	36.5	66.9	500.0	-17.5
4331.00	H	125.0	1.0	43.1	32.1	3.4	35.6	43.0	140.6	500.0	-11.0

Table 6. Radiated Emissions Test Data, Mid Channel, Peak Data

CLIENT:	NBB Controls	DATE:	4/1/2005
TESTER:	James Ritter	JOB #:	8520
EUT:	Nano-L	TEST STANDARD:	FCC Part 15.231
CONFIGURATION:	Transmit @chan 34	DISTANCE:	3m
CLOCKS:	12.5 MHz	CLASS:	B
<u>Low Frequency Test Equipment/Limit:</u>		<u>High Frequency Test Equipment/Limit:</u>	
ANTENNA:	A_00007	ANTENNA:	A_00425
CABLE:	CSITE2_3m	CABLE:	CSITE2_HF
LIMIT:	LFCC_3m_Class_B	AMPLIFIER:	A_00066
TX Frequency	433.925		

Frequency (MHz)	Pol H/V	Azimuth Degree	Ant. Height (m)	SA Level (dBuV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp (dB)	Corr. Level (dBuV/m)	Corr. Level (uV/m)	Limit (uV/m)	Margin dB	Notes
433.93	V	270.0	3.0	49.7	15.4	3.1	0.0	68.2	2570.1	109968.8	-32.6	
867.85	V	180.0	2.5	9.2	20.4	4.4	0.0	34.0	49.9	10996.9	-46.9	
1301.78	V	90.0	1.0	48.1	26.7	2.0	36.1	40.7	108.1	5000.0	-33.3	
1735.70	V	85.0	1.0	53.1	28.4	3.0	35.7	48.7	273.5	10996.9	-32.1	
2169.63	V	180.0	1.0	48.9	29.5	3.3	35.5	46.1	202.5	10996.9	-34.7	
2603.55	V	0.0	1.0	41.1	30.2	3.0	35.6	38.6	85.5	10996.9	-42.2	amb
3037.48	V	180.0	1.0	45.3	30.7	2.8	35.7	43.1	142.3	10996.9	-37.8	amb
3471.40	V	250.0	1.0	47.7	31.0	2.8	35.5	45.8	196.0	10996.9	-35.0	
3905.33	V	180.0	1.0	42.4	31.2	2.8	35.4	40.9	110.5	5000.0	-33.1	
4339.25	V	90.0	1.0	46.3	32.1	3.4	35.6	46.2	204.9	5000.0	-27.8	
433.93	H	270.0	3.0	49.7	15.4	3.1	0.0	68.2	2570.1	109968.8	-32.6	
867.85	H	180.0	2.5	11.5	20.4	4.4	0.0	36.3	65.1	10996.9	-44.6	
1301.78	H	220.0	1.0	46.8	26.7	2.0	36.1	39.3	92.5	5000.0	-34.7	
1735.70	H	180.0	1.0	49.9	28.4	3.0	35.7	45.6	189.5	10996.9	-35.3	
2169.63	H	290.0	1.0	48.8	29.5	3.3	35.5	46.1	201.1	10996.9	-34.8	
2603.55	H	180.0	1.0	54.1	30.2	3.0	35.6	51.6	382.1	10996.9	-29.2	
3037.48	H	125.0	1.0	44.5	30.7	2.8	35.7	42.3	130.1	10996.9	-38.5	
3471.40	H	125.0	1.0	46.4	31.0	2.8	35.5	44.6	169.0	10996.9	-36.3	
3905.33	H	220.0	1.0	47.6	31.2	2.8	35.4	46.1	202.3	5000.0	-27.9	
4339.25	H	190.0	1.0	48.8	32.1	3.4	35.6	48.7	271.9	5000.0	-25.3	
573.25	V	270.0	3.0	12.1	18.0	3.5	0.0	33.6	48.0	200.0	-12.4	
588.72	V	190.0	2.6	6.9	17.2	3.6	0.0	27.6	24.1	200.0	-18.4	
1229.30	V	180.0	1.3	47.1	26.3	1.8	36.2	39.1	89.9	500.0	-14.9	
1254.60	V	190.0	1.2	45.4	26.4	1.9	36.1	37.5	75.3	500.0	-16.4	
1369.70	V	180.0	1.0	40.1	27.0	2.2	36.0	33.2	45.7	500.0	-20.8	
1830.25	V	180.0	1.5	46.6	28.7	3.1	35.6	42.8	138.3	500.0	-11.2	
573.25	H	90.0	1.5	9.8	18.0	3.5	0.0	31.3	36.8	200.0	-14.7	
588.72	H	180.0	1.6	6.9	17.2	3.6	0.0	27.6	24.1	200.0	-18.4	
1229.30	H	165.0	2.0	39.1	26.3	1.8	36.2	31.1	35.8	500.0	-22.9	
1254.60	H	180.0	2.0	34.7	26.4	1.9	36.1	26.9	22.1	500.0	-27.1	
1369.70	H	90.0	2.0	38.7	27.0	2.2	36.0	31.8	38.9	500.0	-22.2	
1830.25	H	165.0	1.4	40.7	28.7	3.1	35.6	36.9	69.8	500.0	-17.1	

Table 7. Radiated Emissions Test Data, Mid Channel, Average Data

CLIENT:	NBB Controls	DATE:	4/1/2005
TESTER:	James Ritter	JOB #:	8520
<u>EUT Information:</u>		<u>Test Requirements:</u>	
EUT:	Nano-L	TEST STANDARD:	FCC Part 15.231
CONFIGURATION:	Transmit @chan 34	DISTANCE:	3m
CLOCKS:	12.5 MHz	CLASS:	B
<u>Low Frequency Test Equipment/Limit:</u>		<u>High Frequency Test Equipment/Limit:</u>	
ANTENNA:	A_00007	ANTENNA:	A_00425
CABLE:	CSITE2_3m	CABLE:	CSITE2_HF
LIMIT:	LFCC_3m_Class_B	AMPLIFIER:	A_00066
TX Frequency	433.925		

Frequency	Pol	Azimuth	Ant. Height	SA Level	Ant. Corr.	Cable Corr.	Amp	Corr. Level	Corr. Level	Limit	Margin	Notes
(MHz)	H/V	Degree	(m)	(dBuV)	(dB/m)	(dB)	(dB)	(dBuV/m)	(uV/m)	(uV/m)	dB	
				Avg.								
433.93	V	270.0	3.0	49.5	15.4	3.1	0.0	68.0	2511.6	10996.9	-12.8	
867.85	V	180.0	2.5	6.9	20.4	4.4	0.0	31.7	38.3	1099.7	-29.2	
1301.78	V	90.0	1.0	38.3	26.7	2.0	36.1	30.8	34.9	500.0	-23.1	
1735.70	V	85.0	1.0	36.8	28.4	3.0	35.7	32.4	41.9	1099.7	-28.4	
2169.63	V	180.0	1.0	41.7	29.5	3.3	35.5	39.0	88.8	1099.7	-21.9	
2603.55	V	0.0	1.0	39.1	30.2	3.0	35.6	36.6	67.9	1099.7	-24.2	
3037.48	V	180.0	1.0	34.4	30.7	2.8	35.7	32.2	40.7	1099.7	-28.6	amb
3471.40	V	250.0	1.0	38.6	31.0	2.8	35.5	36.8	69.0	1099.7	-24.0	amb
3905.33	V	180.0	1.0	35.8	31.2	2.8	35.4	34.3	51.7	500.0	-19.7	
4339.25	V	90.0	1.0	26.0	32.1	3.4	35.6	25.9	19.6	500.0	-28.1	
433.93	H	190.0	1.5	58.0	15.4	3.1	0.0	76.5	6682.7	10996.9	-4.3	
867.85	H	20.0	1.2	15.6	20.4	4.4	0.0	40.4	104.3	1099.7	-20.5	
1301.78	H	220.0	1.0	34.4	26.7	2.0	36.1	27.0	22.3	500.0	-27.0	
1735.70	H	180.0	1.0	39.8	28.4	3.0	35.7	35.5	59.4	1099.7	-25.4	
2169.63	H	290.0	1.0	40.3	29.5	3.3	35.5	37.6	75.9	1099.7	-23.2	
2603.55	H	180.0	1.0	36.7	30.2	3.0	35.6	34.2	51.5	1099.7	-26.6	
3037.48	H	125.0	1.0	34.5	30.7	2.8	35.7	32.3	41.0	1099.7	-28.6	
3471.40	H	125.0	1.0	36.9	31.0	2.8	35.5	35.1	56.7	1099.7	-25.7	
3905.33	H	220.0	1.0	40.1	31.2	2.8	35.4	38.6	85.1	500.0	-15.4	
4339.25	H	190.0	1.0	44.0	32.1	3.4	35.6	43.9	156.3	500.0	-10.1	

Table 8. Radiated Emissions Test Data, High Channel, Peak Data

CLIENT:	NBB Controls	DATE:	4/1/2005
TESTER:	James Ritter	JOB #:	8520
<u>EUT Information:</u>		<u>Test Requirements:</u>	
EUT:	Nano-L	TEST STANDARD:	FCC Part 15.231
CONFIGURATION:	Transmit @chan 67	DISTANCE:	3m
CLOCKS:	12.5 MHz	CLASS:	B
<u>Low Frequency Test Equipment/Limit:</u>		<u>High Frequency Test Equipment/Limit:</u>	
ANTENNA:	A_00007	ANTENNA:	A_00425
CABLE:	CSITE2_3m	CABLE:	CSITE2_HF
LIMIT:	LFCC_3m_Class_B	AMPLIFIER:	A_00066
TX Frequency	434.75		

Frequency (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level (dBuV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp Gain (dB)	Corr. Level (dBuV/m)	Corr. Level (uV/m)	Limit (uV/m)	Margin dB
				Peak							
434.75	V	290	2.4	50.0	15.4	3.1	0.0	68.5	2670.8	110312.5	-32.3
869.50	V	180	2.3	11.2	20.4	4.4	0.0	36.0	63.2	11031.3	-44.8
1304.25	V	180	1.0	49.3	26.7	2.0	36.1	41.9	124.1	5000.0	-32.1
1739.00	V	190	1.0	53.8	28.4	3.0	35.7	49.5	297.2	11031.3	-31.4
2173.75	V	45	1.0	51.2	29.5	3.3	35.5	48.5	266.7	11031.3	-32.3
2608.50	V	270	1.0	54.3	30.2	3.0	35.6	51.8	391.1	11031.3	-29.0
3043.25	V	225	1.0	45.6	30.7	2.8	35.7	43.4	148.1	11031.3	-37.4
3478.00	V	190	1.0	46.6	31.0	2.8	35.5	44.8	174.0	11031.3	-36.0
3912.75	V	0.0	1.0	47.6	31.2	2.8	35.4	46.1	202.4	5000.0	-27.9
4347.50	V	90	1.0	46.2	32.1	3.4	35.6	46.1	202.3	5000.0	-27.9
434.75	H	125	2.8	58.1	15.4	3.1	0.0	76.6	6786.4	110312.5	-24.2
869.50	H	165	3.0	18.1	20.4	4.4	0.0	42.9	139.9	11031.3	-37.9
1304.25	H	180	1.0	45.7	26.7	2.0	36.1	38.3	82.0	5000.0	-35.7
1739.00	H	125	1.0	51.8	28.4	3.0	35.7	47.5	237.2	11031.3	-33.4
2173.75	H	270	1.0	47.8	29.5	3.3	35.5	45.1	179.7	11031.3	-35.8
2608.50	H	90	1.0	56.4	30.2	3.0	35.6	53.9	498.1	11031.3	-26.9
3043.25	H	170	1.0	44.6	30.7	2.8	35.7	42.4	131.7	11031.3	-38.5
3478.00	H	220	1.0	45.9	31.0	2.8	35.5	44.1	160.0	11031.3	-36.8
3912.75	H	0.0	1.0	45.5	31.2	2.8	35.4	44.0	158.6	5000.0	-30.0
4347.50	H	165	1.0	48.6	32.1	3.4	35.6	48.5	266.7	5000.0	-25.5

Table 9. Radiated Emissions Test Data, High Channel, Average Data

CLIENT:	NBB Controls	DATE:	4/1/2005
TESTER:	James Ritter	JOB #:	8520
<u>EUT Information:</u>		<u>Test Requirements:</u>	
EUT:	Nano-L	TEST STANDARD:	FCC Part 15.231
CONFIGURATION:	Transmit @chan 67	DISTANCE:	3m
CLOCKS:	12.5 MHz	CLASS:	B
<u>Low Frequency Test Equipment/Limit:</u>		<u>High Frequency Test Equipment/Limit:</u>	
ANTENNA:	A_00007	ANTENNA:	A_00425
CABLE:	CSITE2_3m	CABLE:	CSITE2_HF
LIMIT:	LFCC_3m_Class_B	AMPLIFIER:	A_00066
TX Frequency	434.75		

Frequency (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level (dBuV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp Gain (dB)	Corr. Level (dBuV/m)	Corr. Level (uV/m)	Limit (uV/m)	Margin dB
				Avg.							
434.75	V	290	2.4	49.7	15.4	3.1	0.0	68.2	2580.1	11031.3	-12.6
869.50	V	180	2.2	6.9	20.4	4.4	0.0	31.7	38.5	1103.1	-29.1
1304.25	V	180	1.0	40.6	26.7	2.0	36.1	33.1	45.4	500.0	-20.8
1739.00	V	190	1.0	45.0	28.4	3.0	35.7	40.7	108.2	1103.1	-20.2
2173.75	V	15	1.0	43.4	29.5	3.3	35.5	40.6	107.7	1103.1	-20.2
2608.50	V	270	1.0	43.1	30.2	3.0	35.6	40.6	107.7	1103.1	-20.2
3043.25	V	225	1.0	35.4	30.7	2.8	35.7	33.2	45.7	1103.1	-27.7
3478.00	V	190	1.0	38.5	31.0	2.8	35.5	36.7	68.5	1103.1	-24.1
3912.75	V	0.0	1.0	39.6	31.2	2.8	35.4	38.1	80.3	500.0	-15.9
4347.50	V	90	1.0	36.0	32.1	3.4	35.6	35.9	62.3	500.0	-18.1
434.75	H	125	2.8	57.6	15.4	3.1	0.0	76.1	6406.8	11031.3	-4.7
869.50	H	165	3.0	16.6	20.4	4.4	0.0	41.4	117.7	1103.1	-19.4
1304.25	H	180	1.0	34.1	26.7	2.0	36.1	26.7	21.6	500.0	-27.3
1739.00	H	125	1.0	38.1	28.4	3.0	35.7	33.8	48.8	1103.1	-27.1
2173.75	H	270	1.0	39.0	29.5	3.3	35.5	36.3	65.2	1103.1	-24.6
2608.50	H	90	1.0	35.6	30.2	3.0	35.6	33.1	45.4	1103.1	-27.7
3043.25	H	170	1.0	34.7	30.7	2.8	35.7	32.5	42.1	1103.1	-28.4
3478.00	H	220	1.0	36.0	31.0	2.8	35.5	34.2	51.0	1103.1	-26.7
3912.75	H	0.0	1.0	35.7	31.2	2.8	35.4	34.2	51.4	500.0	-19.8
4347.50	H	165	1.0	43.5	32.1	3.4	35.6	43.4	148.2	500.0	-10.6