FCC PART 15 SUBPART B and C
TEST REPORT

for

BIONOMADIX TRANSMITTER

MODEL: BN-TX

Prepared for

BIOPAC SYSTEMS, INC.
42 AERO CAMINO
SANTA BARBARA, CALIFORNIA 93117

Prepared by:___ 

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DATE: NOVEMBER 30, 2011

	REPORT	APPENDICES					TOTAL
	BODY	***A***	***B***	***C***	***D***	***E***	
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GENERAL REPORT SUMMARY

Compatible Electronics Inc. generates this electromagnetic emission test report, which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.

Device Tested:	BioNomadix Transmitter Model: BN-TX S/N: ACCL311007000111
Product Description:	See Expository Statement
Modifications:	The EUT was not modified in order to meet the specifications.
Customer:	BIOPAC Systems, Inc. 42 Aero Camino Santa Barbara, California 93117
Test Date(s):	11/28/2011 – 11/29/2011
Test Specifications:	Emissions requirements CFR Title 47, Part 15, Subpart B and Subpart C, Sections 15.205, 15.209, and 15.249
Test Procedure:	ANSI C63.4
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions 150 kHz to 30 MHz	This test was not performed because the EUT operates on battery power only and cannot be plugged into the AC public mains.
2	Radiated RF Emissions 10 kHz to 25000 MHz (Transmitter, Receiver, and Digital Portion)	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.249.

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the BioNomadix Transmitter, Model: BN-TX. The Emissions measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B for the digital and receiver portion; and the limits defined in Subpart C, sections 15.205, 15.209, and 15.249 for the transmitter portion.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

BIOPAC System, Inc.

Alan Macy	R&D Director

Compatible Electronics Inc.

David Tran	Test Technician
Kyle Fujimoto	Test Engineer
James Ross	Test Engineer

2.4 Date Test Sample was Received

The test sample was received prior to the date of testing.

2.5 Disposition of the Test Sample

The test sample has not yet been returned as of the date of this report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

FCC	Federal Communications Commission
RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
ITE	Information Technology Equipment
LISN	Line Impedance Stabilization Network
NVLAP	National Voluntary Laboratory Accreditation Program
CFR	Code of Federal Regulations
N/A	Not Applicable
Ltd.	Limited
Inc.	Incorporated
NCR	No Calibration Required
R&D	Research and Development
Rx	Receive / Receiver
Tx	Transmit / Transmitter

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this Emissions Test Report.

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4: 2009	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

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – Emissions

The BioNomadix Transmitter, Model: BN-TX (EUT) tested as a stand alone unit and tested in three orthogonal axis. The EUT was continuously transmitting and receiving.

The antenna is soldered to the PCB.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The final emissions data was taken in this mode of operation and any cables were maximized. All initial investigations were performed with the measurement receiver in manual mode scanning the frequency range continuously. Photographs of the test setup are in Appendix D of this report.

4.1.1 Cable Construction and Termination

There were no external cables connected to the EUT.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
BIONOMADIX TRANSMITTER (EUT)	BIOPAC SYSTEMS, INC.	BN-TX	ACCL31107000111	ZWIBNXT1 IC: 9901A-BNXT1

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS					
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	2637A03618	May 27, 2011	May 27, 2012
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	2648A13404	May 27, 2011	May 27, 2012
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	May 27, 2011	May 27, 2012
EMI Receiver	Rohde & Schwarz	ESIB40	100194	November 19, 2010	November 19, 2012
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
RF RADIATED EMISSIONS TEST EQUIPMENT					
Loop Antenna	Com-Power	AL-130	17089	January 21, 2011	January 21, 2012
Biconical Antenna	Com Power	AB-900	15250	June 8, 2011	June 8, 2012
Log Periodic Antenna	Com Power	AL-100	16252	June 8, 2011	June 8, 2012
Horn Antenna	Com-Power	AH-118	071175	March 18, 2010	March 18, 2012
Horn Antenna	Com-Power	AH826	71957	NCR	N/A
Preamplifier	Com-Power	PA-102	1017	January 11, 2011	January 12, 2012
Microwave Preamplifier	Com-Power	PA-118	181656	December 22, 2010	December 22, 2011
Microwave Preamplifier	Com-Power	PA-840	711013	March 11, 2010	March 11, 2012
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1.2 of this report for Emissions test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT not grounded.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The measurement receiver was used as a measuring meter. The data was collected with the measurement receiver in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A transient limiter was used for the protection of the measurement receiver's input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the measurement receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics conducted emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

Test Results:

This test was not performed because the EUT operates on battery power only and cannot be plugged into the AC public mains.

7.1.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer and EMI Receiver were used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com-Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, the Com-Power Microwave Preamplifier Model: PA-118 was used for frequencies from 1 GHz to 18 GHz, and the Com-Power Microwave Preamplifier Model: PA-840 were used for frequencies above 18 GHz. The spectrum analyzer and EMI Receiver were used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps.

The quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets.

The frequencies above 1 GHz were averaged manually by narrowing the video filter down to 10 Hz and putting the sweep time on AUTO on the spectrum analyzer to keep the amplitude reading calibrated.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
10 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 25 GHz	1 MHz	Horn Antennas

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT by the Radiated Emission Manual Test software. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.

Radiated Emissions (Spurious and Harmonics) Test (continued)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3-meter test distance to obtain the final test data.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, Sections 15.209 and 15.249.

7.1.3 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
BioNomadix Transmitter, Model: BN-TX

Frequency MHz	Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
4804 (Horizontal) (X-Axis)	51.26 (A)	54.00	-2.74
4804 (Horizontal) (Z-Axis)	50.73 (A)	54.00	-3.27
2481 (Horizontal) (Z-Axis)	90.22 (A)	94.00	-3.78
4880 (Horizontal) (X-Axis)	49.74 (A)	54.00	-4.26
2481 (Horizontal) (X-Axis)	89.59 (A)	94.00	-4.41
4804 (Vertical) (Y-Axis)	89.59 (A)	94.00	-4.41

Notes:

* The complete emissions data is given in Appendix E of this report.
A Average Reading

8. CONCLUSIONS

The BioNomadix, Model: BN-TX (EUT), as tested, meets all of the **Class B** specification limits defined in CFR Title 47, Part 15, Subpart B for the digital and receiver portion; and the limits defined in Subpart C, sections 15.205, 15.209, and 15.249 for the transmitter portion.

APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP LAB CODES 200063-0, 200528-0, 200527-0

For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025. Please follow the link to the NIST/NVLAP site for each of our facilities' NVLAP certificate and scope of accreditation

NVLAP listing links

Agoura Division / **Brea Division** / **Silverado/Lake Forest Division**

.Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."

ANSI listing CETCB

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).
US/EU MRA list NIST MRA site

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).
APEC MRA list NIST MRA site

We are also listed for IT products by the following country/agency:

VCCI Support member: Please visit http://www.vcci.jp/vcci_e/

FCC Listing, from FCC OET site
FCC test lab search https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm

Industry Canada Industrie Canada Compatible Electronics IC listing can be found at:
http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.249 and/or FCC **Class B** specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modification were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

BIONOMADIX TRANSMITTER
MODEL: BN-TX
S/N: ACCL31107000111

ALSO APPROVED UNDER THIS REPORT:

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

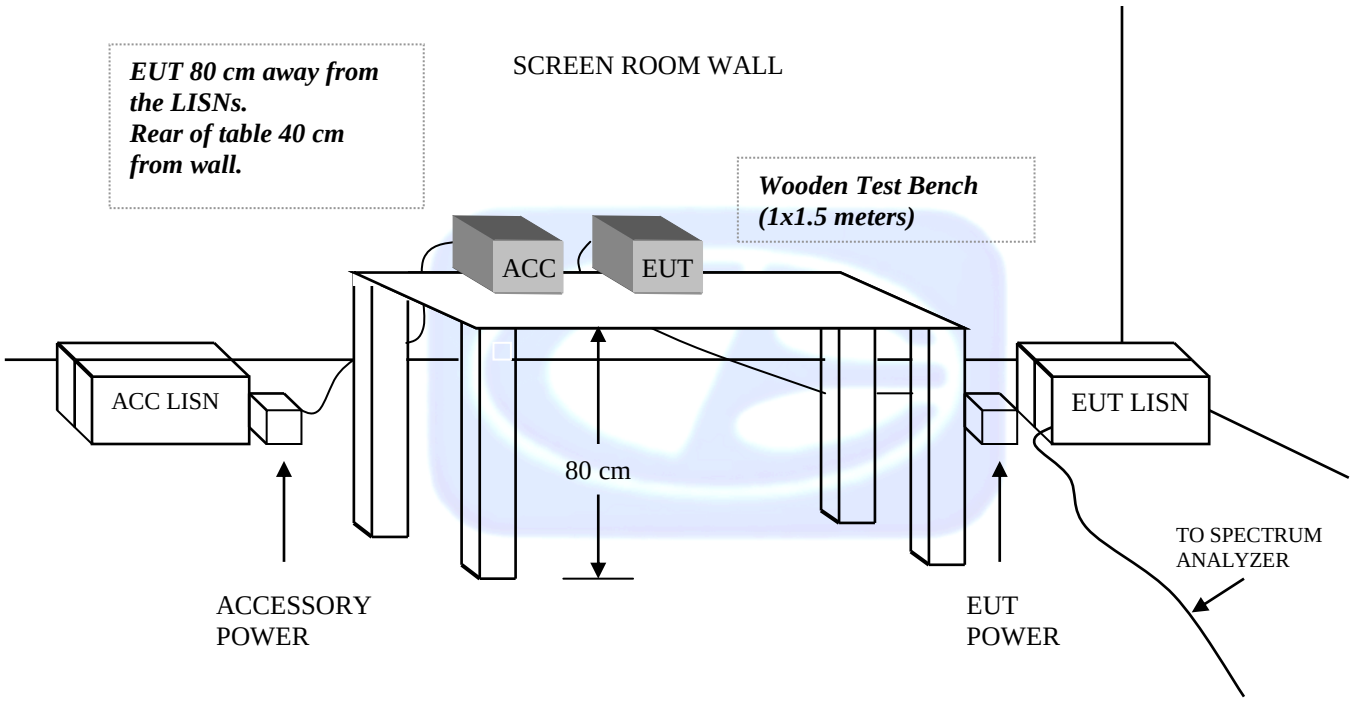
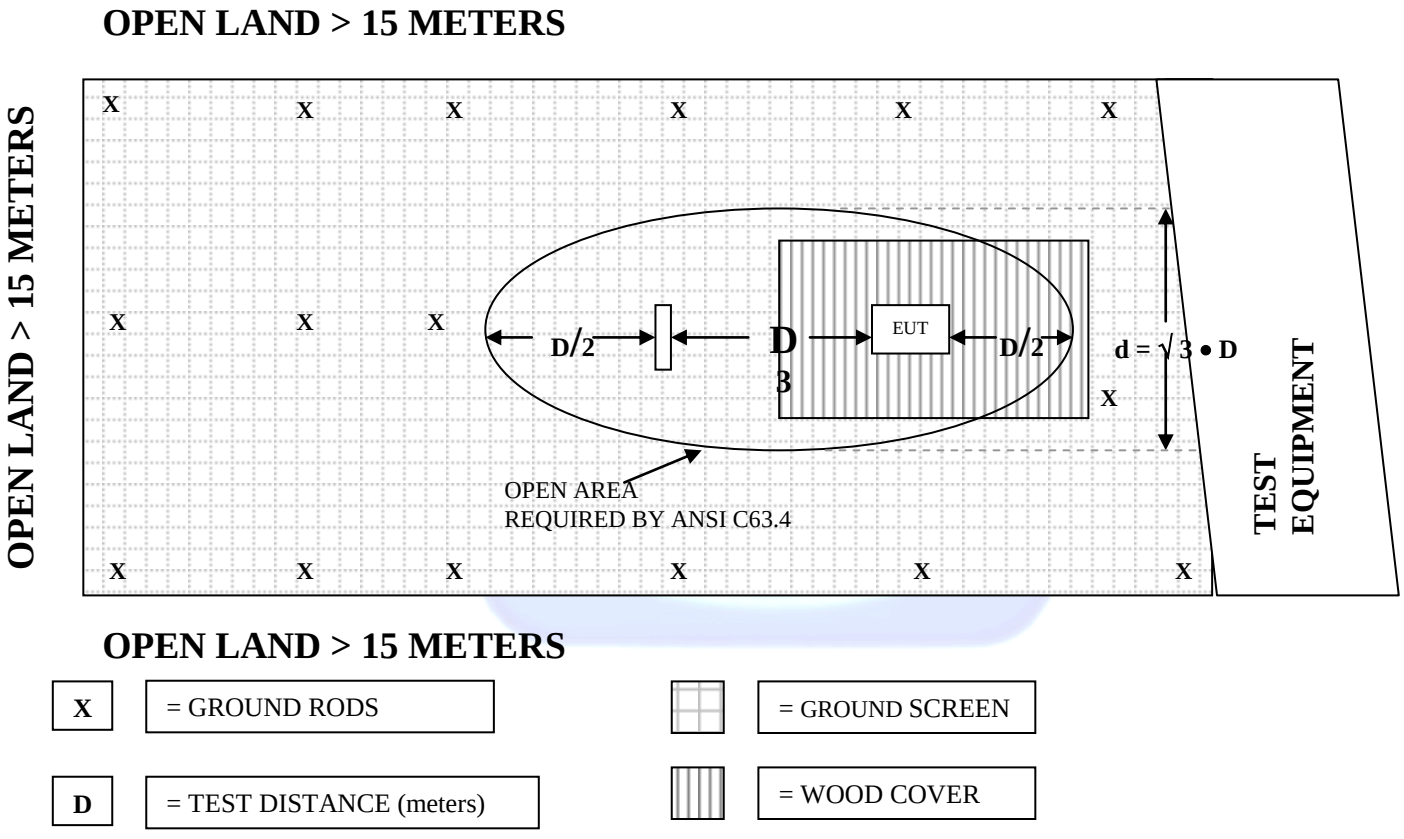


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE – 3 METERS



COM-POWER AL-130

LOOP ANTENNA

S/N: 17089

CALIBRATION DATE: JANUARY 21, 2011

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-41.9	9.6
0.01	-41.79	9.71
0.02	-41.43	10.07
0.05	-41.53	9.97
0.07	-41.47	10.03
0.1	-41.44	10.06
0.2	-41.61	9.89
0.3	-41.62	9.88
0.5	-41.66	9.84
0.7	-41.48	10.02
1	-41.13	10.37
2	-40.89	10.61
3	-41.00	10.50
4	-41.14	10.36
5	-41.02	10.48
10	-40.69	10.82
15	-40.41	11.09
20	-41.07	10.43
25	-42.10	9.40
30	-41.15	10.35

COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15250

CALIBRATION DATE: JUNE 8, 2011

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	10.90	100	9.50
35	11.00	120	12.10
40	11.80	140	11.40
45	11.60	160	12.40
50	11.40	180	15.70
60	9.80	200	16.20
70	7.00	250	16.10
80	5.70	275	19.00
90	7.00	300	9.50

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16252

CALIBRATION DATE: JUNE 8, 2011

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	13.30	700	20.40
400	15.50	800	20.60
500	15.80	900	20.10
600	20.20	1000	22.80

COM POWER AH-118

HORN ANTENNA

S/N: 071175

CALIBRATION DATE: MARCH 18, 2010

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	22.2	10.0	39.8
1.5	24.2	10.5	40.2
2.0	27.2	11.0	39.7
2.5	27.8	11.5	39.9
3.0	30.5	12.0	41.7
3.5	30.9	12.5	42.7
4.0	31.9	13.0	42.3
4.5	33.2	13.5	40.3
5.0	33.6	14.0	42.6
5.5	36.2	14.5	43.4
6.0	35.8	15.0	41.9
6.5	36.1	15.5	40.8
7.0	37.9	16.0	41.0
7.5	37.4	16.5	41.5
8.0	38.0	17.0	44.5
8.5	38.8	17.5	47.6
9.0	38.0	18.0	50.8
9.5	39.2		

COM-POWER AH826

HORN ANTENNA

S/N: 71957

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	33.5	22.5	35.5
18.5	33.5	23.0	35.9
19.0	34.0	23.5	35.7
19.5	34.0	24.0	35.6
20.0	34.3	24.5	36.0
20.5	34.9	25.0	36.2
21.0	34.7	25.5	36.1
21.5	35.0	26.0	36.2
22.0	35.0	26.5	35.7

COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 11, 2011

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.1	300	38.1
40	38.2	350	38.0
50	38.2	400	37.9
60	38.2	450	37.7
70	38.2	500	37.6
80	38.2	550	37.9
90	38.2	600	37.9
100	38.1	650	37.7
125	38.2	700	37.9
150	38.2	750	37.5
175	38.2	800	37.6
200	38.2	850	37.6
225	38.2	900	37.0
250	38.2	950	37.2
275	38.2	1000	36.8

COM-POWER PA-118

PREAMPLIFIER

S/N: 181656

CALIBRATION DATE: DECEMBER 22, 2010

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.90	10.0	26.07
1.5	26.50	10.5	24.97
2.0	26.79	11.0	24.79
2.5	26.90	11.5	24.33
3.0	27.03	12.0	24.24
3.5	26.94	12.5	24.92
4.0	27.18	13.0	24.52
4.5	26.79	13.5	24.33
5.0	26.25	14.0	24.56
5.5	26.16	14.5	24.99
6.0	25.52	15.0	26.06
6.5	25.29	15.5	26.87
7.0	24.45	16.0	25.95
7.5	24.18	16.5	24.69
8.0	24.02	17.0	24.20
8.5	24.54	17.5	25.12
9.0	24.91	18.0	26.03
9.5	25.42		

COM-POWER PA-840

MICROWAVE PREAMPLIFIER

S/N: 711013

CALIBRATION DATE: MARCH 11, 2010

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	24.36	29.5	23.52
18.5	24.54	30.0	21.73
19.0	24.06	30.5	22.34
19.5	23.71	31.0	20.06
20.0	23.42	31.5	20.02
20.5	22.87	32.0	18.11
21.0	22.60	32.5	19.35
21.5	21.08	33.0	17.50
22.0	22.13	33.5	17.49
22.5	22.42	34.0	17.48
23.0	22.85	34.5	18.57
23.5	22.85	35.0	18.64
24.0	23.82	35.5	18.82
24.5	22.33	36.0	19.14
25.0	24.09	36.5	18.58
25.5	23.20	37.0	15.07
26.0	23.18	37.5	17.29
26.5	23.50	38.0	20.82
27.0	24.25	38.5	19.96
27.5	23.58	39.0	20.66
28.0	23.81	39.5	21.41
28.5	23.76	40.0	18.89
29.0	24.83		

FRONT VIEW

BIOPAC SYSTEMS, INC.
BIONOMADIX TRANSMITTER
MODEL: BN-TX
FCC SUBPART B AND C – RADIATED EMISSIONS – 9/27/2011

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

BIOPAC SYSTEMS, INC.
BIONOMADIX TRANSMITTER
MODEL: BN-TX
FCC SUBPART B AND C – RADIATED EMISSIONS – 9/27/2011

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Low Channel - Transmit Mode
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	81.89	V	114	-32.11	Peak	1.25	90	
2402	80.88	V	94	-13.12	Avg	1.25	90	
4804	50.45	V	74	-23.55	Peak	1.25	225	
4804	46.21	V	54	-7.79	Avg	1.25	225	
7206	46.96	V	74	-27.04	Peak	1	225	
7206	37.03	V	54	-16.97	Avg	1	225	
9608								**No Emission**
9608								**Detected**
12010								**No Emission**
12010								**Detected**
14412								**No Emission**
14412								**Detected**
16814								**No Emission**
16814								**Detected**
19216								**No Emission**
19216								**Detected**
21618								**No Emission**
21618								**Detected**
24020								**No Emission**
24020								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Low Channel - Transmit Mode
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	88.99	V	114	-25.01	Peak	1.55	125	
2402	88.21	V	94	-5.79	Peak	1.55	125	
4804	53.39	V	74	-20.61	Peak	1.5	85	
4804	49.12	V	54	-4.88	Avg	1.5	85	
7206	50.42	V	74	-23.58	Peak	1	90	
7206	37.52	V	54	-16.48	Avg	1	90	
9608								**No Emission**
9608								**Detected**
12010								**No Emission**
12010								**Detected**
14412								**No Emission**
14412								**Detected**
16814								**No Emission**
16814								**Detected**
19216								**No Emission**
19216								**Detected**
21618								**No Emission**
21618								**Detected**
24020								**No Emission**
24020								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Low Channel - Transmit Mode
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	87.15	V	114	-26.85	Peak	1.25	135	
2402	85.79	V	94	-8.21	Avg	1.25	135	
4804	53.77	V	74	-20.23	Peak	1.5	50	
4804	48.9	V	54	-5.1	Avg	1.5	50	
7206	51.16	V	74	-22.84	Peak	1	90	
7206	38.62	V	54	-15.38	Avg	1	90	
9608								**No Emission**
9608								**Detected**
12010								**No Emission**
12010								**Detected**
14412								**No Emission**
14412								**Detected**
16814								**No Emission**
16814								**Detected**
19216								**No Emission**
19216								**Detected**
21618								**No Emission**
21618								**Detected**
24020								**No Emission**
24020								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Low Channel - Transmit Mode
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	87.98	H	114	-26.02	Peak	1.25	135	
2402	86.91	H	94	-7.09	Avg	1.25	135	
4804	54.37	H	74	-19.63	Peak	1.6	88	
4804	51.26	H	54	-2.74	Avg	1.6	88	
7206	50.25	H	74	-23.75	Peak	1	0	
7206	37.43	H	54	-16.57	Avg	1	0	
9608								**No Emission**
9608								**Detected**
12010								**No Emission**
12010								**Detected**
14412								**No Emission**
14412								**Detected**
16814								**No Emission**
16814								**Detected**
19216								**No Emission**
19216								**Detected**
21618								**No Emission**
21618								**Detected**
24020								**No Emission**
24020								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Low Channel - Transmit Mode
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	86.82	H	114	-27.18	Peak	1.25	225	
2402	85.63	H	94	-8.37	Avg	1.25	225	
4804	52.59	H	74	-21.41	Peak	1.5	310	
4804	47.47	H	54	-6.53	Avg	1.5	310	
7206	50.48	H	74	-23.52	Peak	1	0	
7206	38.54	H	54	-15.46	Avg	1	0	
9608								**No Emission**
9608								**Detected**
12010								**No Emission**
12010								**Detected**
14412								**No Emission**
14412								**Detected**
16814								**No Emission**
16814								**Detected**
19216								**No Emission**
19216								**Detected**
21618								**No Emission**
21618								**Detected**
24020								**No Emission**
24020								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Low Channel - Transmit Mode
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	88.77	H	114	-25.23	Peak	1.25	135	
2402	87.68	H	94	-6.32	Avg	1.25	135	
4804	55.89	H	74	-18.11	Peak	1.8	40	
4804	50.73	H	54	-3.27	Avg	1.8	40	
7206	50.93	H	74	-23.07	Peak	1	0	
7206	38.34	H	54	-15.66	Avg	1	0	
9608								**No Emission**
9608								**Detected**
12010								**No Emission**
12010								**Detected**
14412								**No Emission**
14412								**Detected**
16814								**No Emission**
16814								**Detected**
19216								**No Emission**
19216								**Detected**
21618								**No Emission**
21618								**Detected**
24020								**No Emission**
24020								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Middle Channel - Transmit Mode
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	80.78	V	114	-33.22	Peak	1.8	300	
2440	79.7	V	94	-14.3	Avg	1.8	300	
4880	47.78	V	74	-26.22	Peak	1.5	300	
4880	41.8	V	54	-12.2	Avg	1.5	300	
7320	49.33	V	74	-24.67	Peak	1	0	
7320	37.79	V	54	-16.21	Avg	1	0	
9760								**No Emission**
9760								**Detected**
12200								**No Emission**
12200								**Detected**
14640								**No Emission**
14640								**Detected**
17080								**No Emission**
17080								**Detected**
19520								**No Emission**
19520								**Detected**
21960								**No Emission**
21960								**Detected**
24400								**No Emission**
24400								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Middle Channel - Transmit Mode
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	89.88	V	114	-24.12	Peak	1.3	50	
2440	88.47	V	94	-5.53	Avg	1.3	50	
4880	53.9	V	74	-20.1	Peak	2	90	
4880	47.03	V	54	-6.97	Avg	2	90	
7320	49.7	V	74	-24.3	Peak	1	0	
7320	36.68	V	54	-17.32	Avg	1	0	
9760								**No Emission**
9760								**Detected**
12200								**No Emission**
12200								**Detected**
14640								**No Emission**
14640								**Detected**
17080								**No Emission**
17080								**Detected**
19520								**No Emission**
19520								**Detected**
21960								**No Emission**
21960								**Detected**
24400								**No Emission**
24400								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Middle Channel - Transmit Mode
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	87.34	V	114	-26.66	Peak	1.3	270	
2440	86.47	V	94	-7.53	Avg	1.3	270	
4880	47.54	V	74	-26.46	Peak	2	190	
4880	39.55	V	54	-14.45	Avg	2	190	
7320	49.33	V	74	-24.67	Peak	1	0	
7320	37.58	V	54	-16.42	Avg	1	0	
9760								**No Emission**
9760								**Detected**
12200								**No Emission**
12200								**Detected**
14640								**No Emission**
14640								**Detected**
17080								**No Emission**
17080								**Detected**
19520								**No Emission**
19520								**Detected**
21960								**No Emission**
21960								**Detected**
24400								**No Emission**
24400								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Middle Channel - Transmit Mode
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	88.09	H	114	-25.91	Peak	1.5	125	
2440	86.89	H	94	-7.11	Avg	1.5	125	
4880	53.11	H	74	-20.89	Peak	2	85	
4880	49.74	H	54	-4.26	Avg	2	85	
7320	50.42	H	74	-23.58	Peak	1	0	
7320	38.09	H	54	-15.91	Avg	1	0	
9760								**No Emission**
9760								**Detected**
12200								**No Emission**
12200								**Detected**
14640								**No Emission**
14640								**Detected**
17080								**No Emission**
17080								**Detected**
19520								**No Emission**
19520								**Detected**
21960								**No Emission**
21960								**Detected**
24400								**No Emission**
24400								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Middle Channel - Transmit Mode
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	85.45	H	114	-28.55	Peak	1.5	330	
2440	84.61	H	94	-9.39	Avg	1.5	300	
4880	48.43	H	74	-25.57	Peak	1	340	
4880	40.55	H	54	-13.45	Avg	1	340	
7320	49.42	H	74	-24.58	Peak	1	0	
7320	38.52	H	54	-15.48	Avg	1	0	
9760								**No Emission**
9760								**Detected**
12200								**No Emission**
12200								**Detected**
14640								**No Emission**
14640								**Detected**
17080								**No Emission**
17080								**Detected**
19520								**No Emission**
19520								**Detected**
21960								**No Emission**
21960								**Detected**
24400								**No Emission**
24400								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Middle Channel - Transmit Mode
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2440	89.52	H	114	-24.48	Peak	1.5	20	
2440	88.63	H	94	-5.37	Avg	1.5	20	
4880	50.06	H	74	-23.94	Peak	1.3	0	
4880	45.19	H	54	-8.81	Avg	1.3	0	
7320	49.53	H	74	-24.47	Peak	1	0	
7320	37.63	H	54	-16.37	Avg	1	0	
9760								**No Emission**
9760								**Detected**
12200								**No Emission**
12200								**Detected**
14640								**No Emission**
14640								**Detected**
17080								**No Emission**
17080								**Detected**
19520								**No Emission**
19520								**Detected**
21960								**No Emission**
21960								**Detected**
24400								**No Emission**
24400								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

High Channel - Transmit Mode
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2481	83.53	V	114	-30.47	Peak	1.25	225	
2481	82.37	V	94	-11.63	Avg	1.25	225	
4962	50.91	V	74	-23.09	Peak	1.25	225	
4962	46.44	V	54	-7.56	Avg	1.25	225	
7443	48.07	V	74	-25.93	Peak	1.15	235	
7443	36.92	V	54	-17.08	Avg	1.15	235	
9924								**No Emission**
9924								**Detected**
12405								**No Emission**
12405								**Detected**
14886								**No Emission**
14886								**Detected**
17367								**No Emission**
17367								**Detected**
19848								**No Emission**
19848								**Detected**
22329								**No Emission**
22329								**Detected**
24810								**No Emission**
24810								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

High Channel - Transmit Mode
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2481	90.26	V	114	-23.74	Peak	1.25	225	
2481	89.05	V	94	-4.95	Avg	1.25	225	
4962	49.54	V	74	-24.46	Peak	1.25	225	
4962	43.29	V	54	-10.71	Avg	1.25	225	
7443	48.26	V	74	-25.74	Peak	1.25	115	
7443	37.05	V	54	-16.95	Avg	1.25	115	
9924								**No Emission**
9924								**Detected**
12405								**No Emission**
12405								**Detected**
14886								**No Emission**
14886								**Detected**
17367								**No Emission**
17367								**Detected**
19848								**No Emission**
19848								**Detected**
22329								**No Emission**
22329								**Detected**
24810								**No Emission**
24810								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

High Channel - Transmit Mode
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2481	85.71	V	114	-28.29	Peak	1.25	135	
2481	83.73	V	94	-10.27	Avg	1.25	135	
4962	45.31	V	74	-28.69	Peak	1.25	135	
4962	38.07	V	54	-15.93	Avg	1.25	135	
7443	50	V	74	-24	Peak	1	155	
7443	37.89	V	54	-16.11	Avg	1	155	
9924								**No Emission**
9924								**Detected**
12405								**No Emission**
12405								**Detected**
14886								**No Emission**
14886								**Detected**
17367								**No Emission**
17367								**Detected**
19848								**No Emission**
19848								**Detected**
22329								**No Emission**
22329								**Detected**
24810								**No Emission**
24810								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

High Channel - Transmit Mode
X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2481	90.77	H	114	-23.23	Peak	1.25	225	
2481	89.59	H	94	-4.41	Avg	1.25	225	
4962	49.99	H	74	-24.01	Peak	1.25	155	
4962	44.46	H	54	-9.54	Avg	1.25	155	
7443	48.39	H	74	-25.61	Peak	1.55	165	
7443	36.75	H	54	-17.25	Avg	1.55	165	
9924								**No Emission**
9924								**Detected**
12405								**No Emission**
12405								**Detected**
14886								**No Emission**
14886								**Detected**
17367								**No Emission**
17367								**Detected**
19848								**No Emission**
19848								**Detected**
22329								**No Emission**
22329								**Detected**
24810								**No Emission**
24810								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

High Channel - Transmit Mode
Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2481	87.37	H	114	-26.63	Peak	1.25	225	
2481	86.26	H	94	-7.74	Avg	1.25	225	
4962	45.67	H	74	-28.33	Peak	1.25	135	
4962	36.33	H	54	-17.67	Avg	1.25	135	
7443	48.45	H	74	-25.55	Peak	1.35	145	
7443	36.61	H	54	-17.39	Avg	1.35	145	
9924								**No Emission**
9924								**Detected**
12405								**No Emission**
12405								**Detected**
14886								**No Emission**
14886								**Detected**
17367								**No Emission**
17367								**Detected**
19848								**No Emission**
19848								**Detected**
22329								**No Emission**
22329								**Detected**
24810								**No Emission**
24810								**Detected**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

High Channel - Transmit Mode
Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2481	91.22	H	114	-22.78	Peak	1.25	180	
2481	90.22	H	94	-3.78	Avg	1.25	180	
4962	49.75	H	74	-24.25	Peak	1.25	155	
4962	44.23	H	54	-9.77	Avg	1.25	155	
7443	48.31	H	74	-25.69	Peak	1.25	135	
7443	36.94	H	54	-17.06	Avg	1.25	135	
9924								**No Emission**
9924								**Detected**
12405								**No Emission**
12405								**Detected**
14886								**No Emission**
14886								**Detected**
17367								**No Emission**
17367								**Detected**
19848								**No Emission**
19848								**Detected**
22329								**No Emission**
22329								**Detected**
24810								**No Emission**
24810								**Detected**

FCC 15.249 and FCC Class B

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Digital Portion and Non-Harmonic Emissions from the Tx
Vertical and Horizontal Polarization - 10 kHz to 25 GHz

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No emissions were
								detected for the digital portion
								Tested in the X-Axis,
								Y-Axis, and Z-Axis
								No emissions were
								detected for the non-harmonic
								emissions from the Tx
								Tested in the X-Axis,
								Y-Axis, and Z-Axis

RSS-210

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

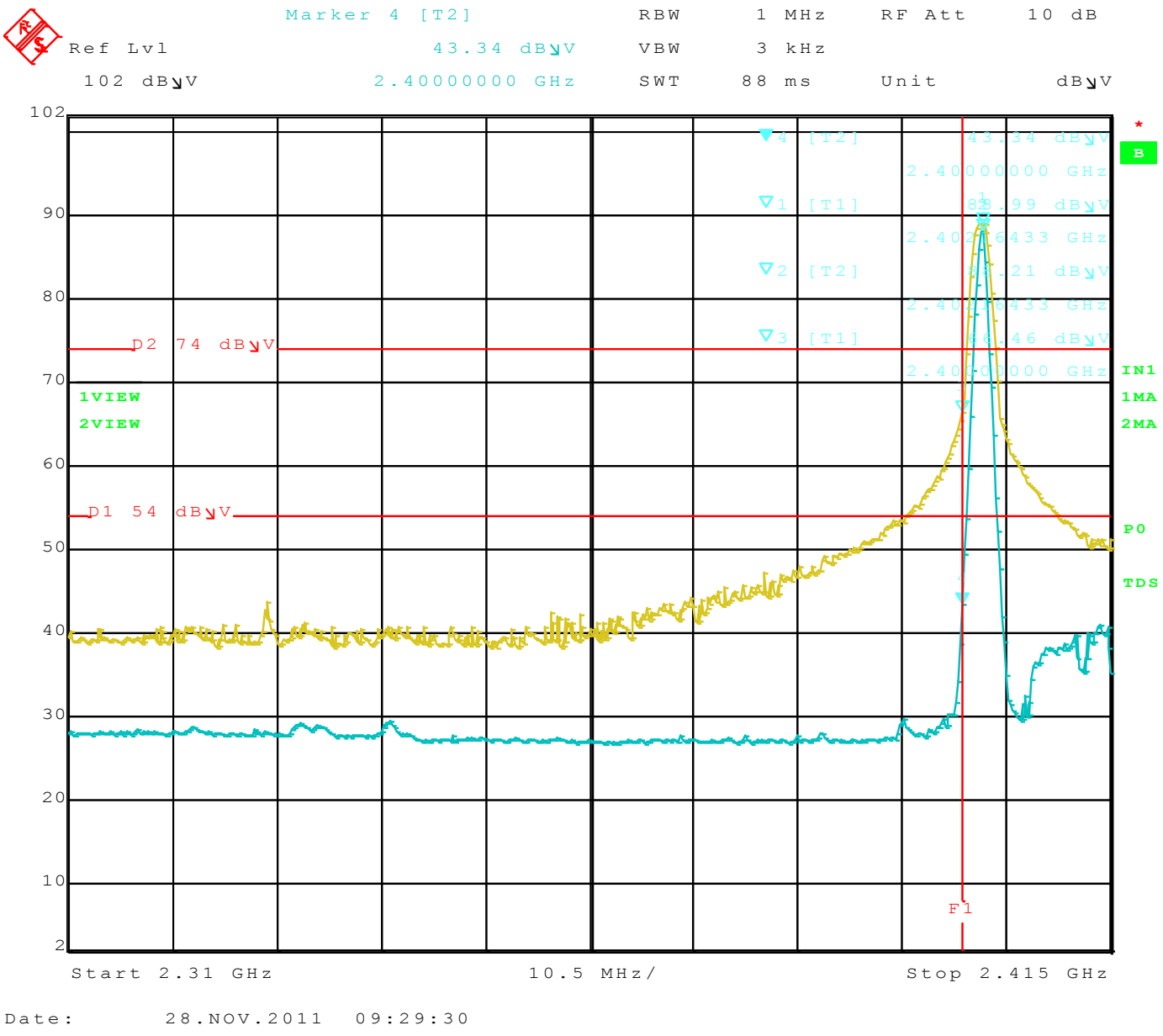
Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Middle Channel - Receive Mode
Vertical and Horizontal Polarization - 10 kHz to 25 GHz

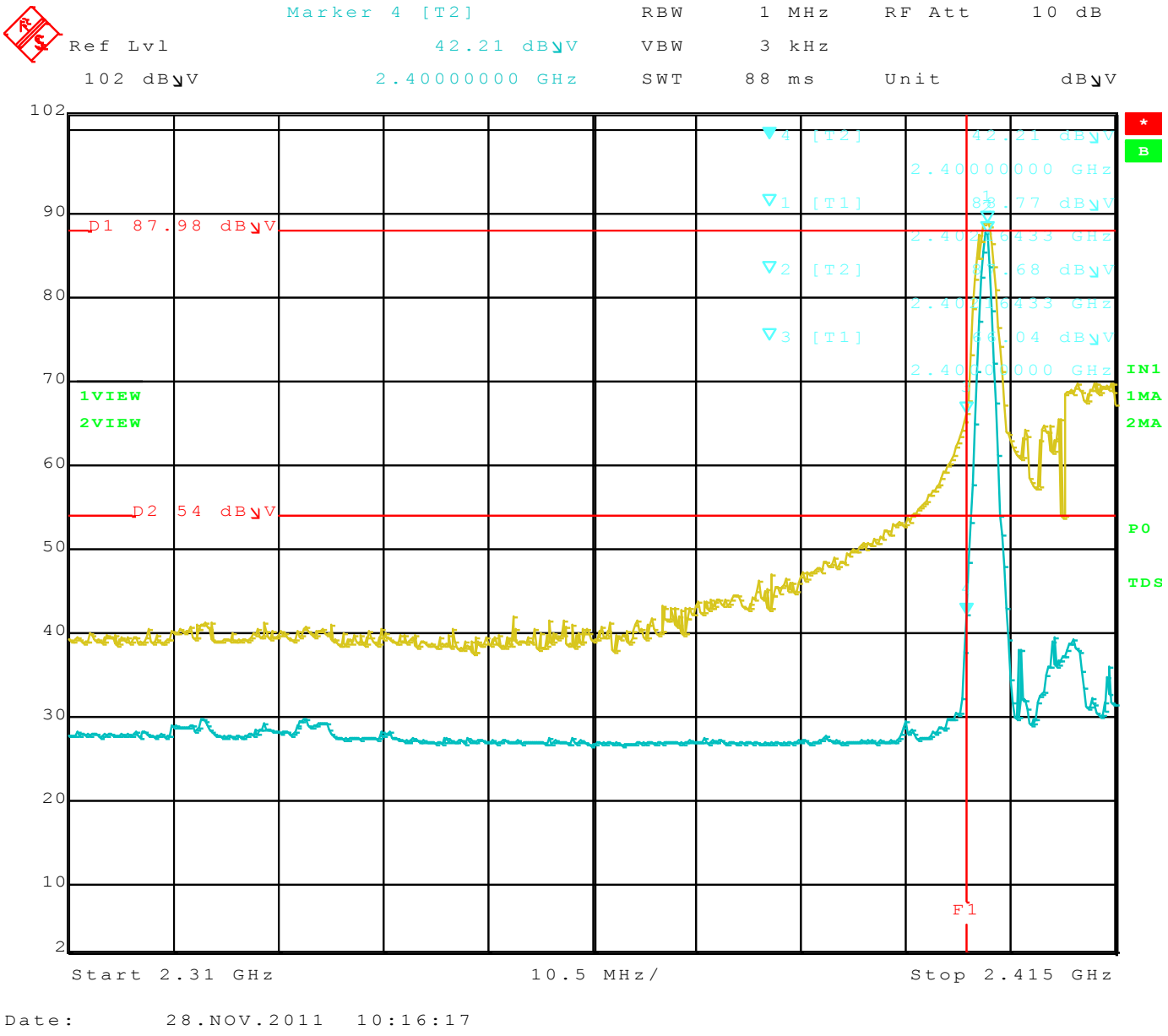
Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No emissions were
								detected in the receive mode
								Tested in the X-Axis,
								Y-Axis, and Z-Axis

BAND EDGES

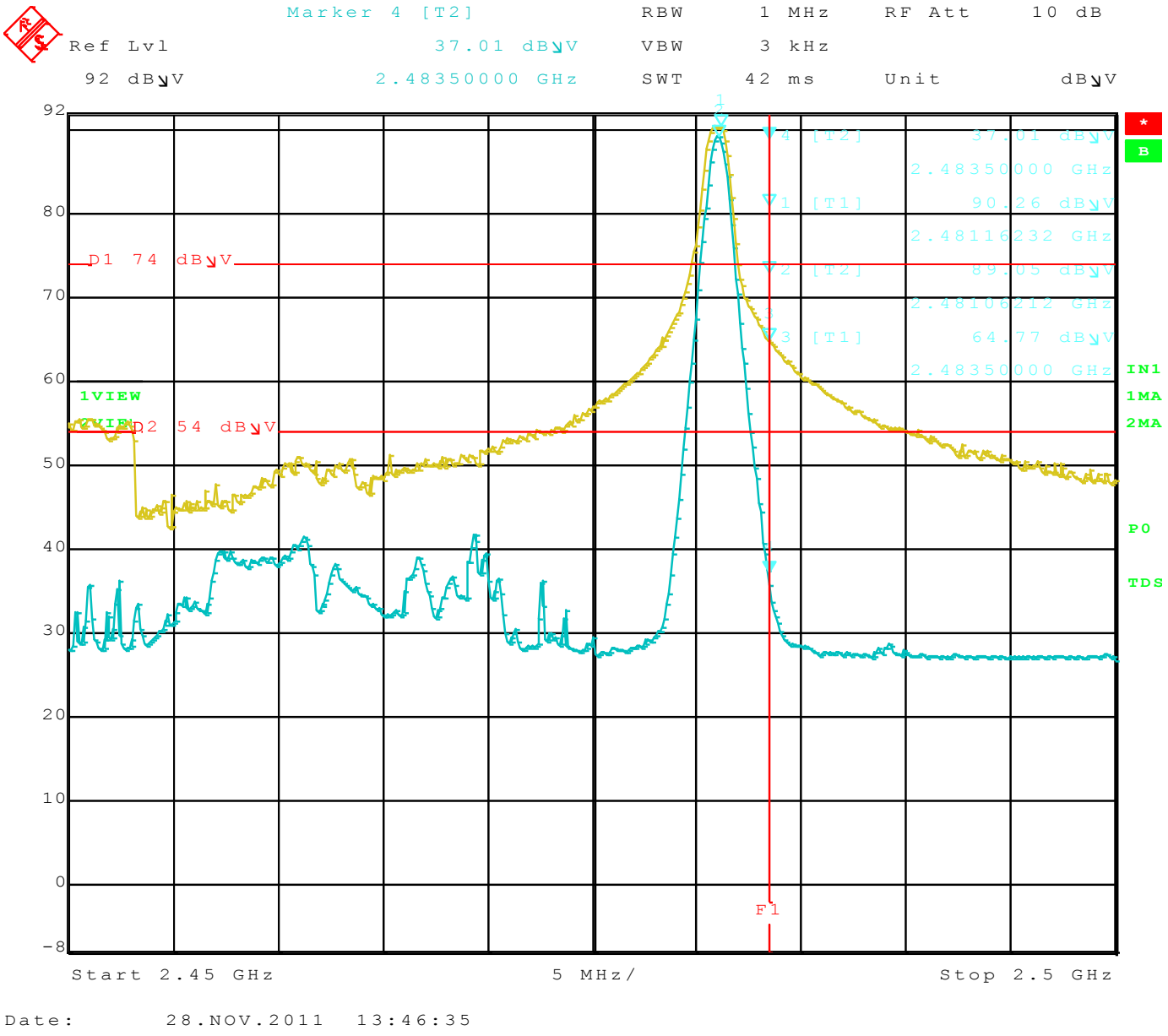
DATA SHEETS



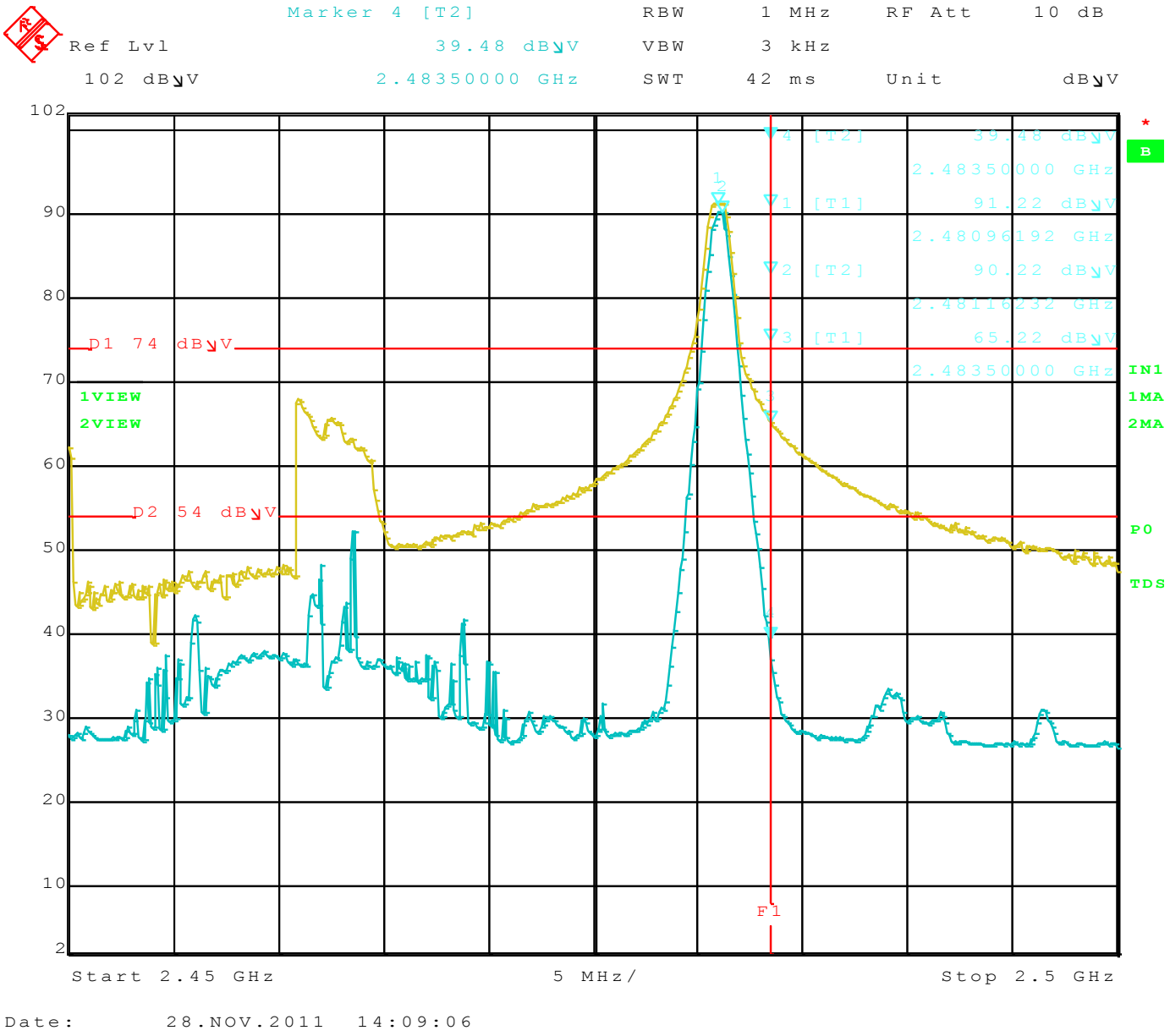
Band Edge – Low Channel – Vertical Polarization – Y-Axis (Worst Case)



Band Edge – Low Channel – Horizontal Polarization – Z-Axis (Worst Case)



Band Edge – High Channel – Vertical Polarization – Y-Axis (Worst Case)



Band Edge – High Channel – Horizontal Polarization – Z-Axis (Worst Case)

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Band Edges - Vertical Polarization

Y-Axis (Worst Case) - Low Channel
Y-Axis (Worst Case) - High Channel

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	88.99	V	114	-25.01	Peak	1.55	125	Fundamental of Low Channel
2402	88.21	V	94	-5.79	Peak	1.55	125	@ 3 meters
2400	66.46	V	74	-7.54	Peak	1.55	125	**Band Edge**
2400	43.34	V	54	-10.66	Avg	1.55	125	**Low Channel**
2481	90.26	V	114	-23.74	Peak	1.25	225	Fundamental of High Channel
2481	89.05	V	94	-4.95	Avg	1.25	225	@ 3 meters
2483.5	64.77	V	74	-9.23	Peak	1.25	225	**Band Edge**
2483.5	37.01	V	54	-16.99	Avg	1.25	225	**High Channel**

FCC 15.249

BIOPACK Systems, Inc.
BioNomadix Transmitter
Model: BN-TX

Date: 11/28/2011
Lab: B
Tested By: Kyle Fujimoto

Band Edges - Horizontal Polarization

Z-Axis (Worst Case) - Low Channel
Z-Axis (Worst Case) - High Channel

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2402	88.77	H	114	-25.23	Peak	1.25	135	Fundamental of Low Channel
2402	87.68	H	94	-6.32	Avg	1.25	135	@ 3 meters
2400	66.04	H	74	-7.96	Peak	1.25	135	**Band Edge**
2400	42.21	H	54	-11.79	Avg	1.25	135	**Low Channel**
2481	91.22	H	114	-22.78	Peak	1.25	180	Fundamental of High Channel
2481	90.22	H	94	-3.78	Avg	1.25	180	@ 3 meters
2483.5	65.22	H	74	-8.78	Peak	1.25	180	**Band Edge**
2483.5	39.48	H	54	-14.52	Avg	1.25	180	**High Channel**