

**FCC PART 15 SUBPART B and C
TEST REPORT***for***2.4 GHZ WAND****MODEL: 0000054**

Prepared for

OBLONG INDUSTRIES, INC.
923 EAST THIRD STREET, UNIT 111
LOS ANGELES, CALIFORNIA 90013

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DATE: OCTOBER 16, 2012

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	16	2	2	2	13	31	66

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1	Conducted Emissions Test Setup
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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: 2.4 GHz Wand
Model: 0000054
S/N: 1112070

Product Description: See Expository Statement

Modifications: The EUT was not modified in order to meet the specifications.

Customer: Oblong Industries, Inc.
923 East Third Street, Unit 111
Los Angeles, California 90013

Test Date(s): May 7 and 8, 2012

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.
2	Radiated RF Emissions 10 kHz to 25000 MHz (Transmitter 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 emissions tests performed on the 2.4 GHz Wand, Model: 0000054 (EUT). 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 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 Emissions 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

Oblong Industries, Inc.

Carl Allendorph G-Speak Engineer

Compatible Electronics Inc.

Kyle Fujimoto Test Engineer

Michael Christensen Lab Manager

2.4 Date Test Sample was Received

The test sample was received May 07, 2012.

2.5 Disposition of the Test Sample

The test sample was returned May 08, 2012.

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

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 2.4 GHz Wand, Model: 0000054 (EUT) was tested as a stand alone unit. The EUT had a special program that allowed the low, middle, or high channels, to be tested by preselecting the channel to be tested. The EUT was tested in three orthogonal axis.

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
2.4 GHZ WAND	OBLONG INDUSTRIES, INC.	0000054	1112070	PUQ-0000054

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
RF RADIATED EMISSIONS TEST EQUIPMENT					
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	May 27, 2011	May 27, 2012
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	2648A14530	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
Loop Antenna	Com-Power	AL-130	17089	January 21, 2011	January 21, 2013
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	February 29, 2012	March 1, 2014
Horn Antenna	Com-Power	AH826	0071957	N/A	N/A
Preamplifier	Com-Power	PA-102	1017	December 28, 2011	December 28, 2012
Microwave Preamplifier	Com-Power	PA-118	181656	December 28, 2011	December 28, 2012
Microwave Preamplifier	Com-Power	PA-840	711919	March 11, 2010	March 11, 2013
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.

7.1.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer, along with the quasi-peak adapter, and EMI Receiver were used as a measuring meter. 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 and EMI receiver records the highest measured reading over the sweeps.

The quasi-peak function 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

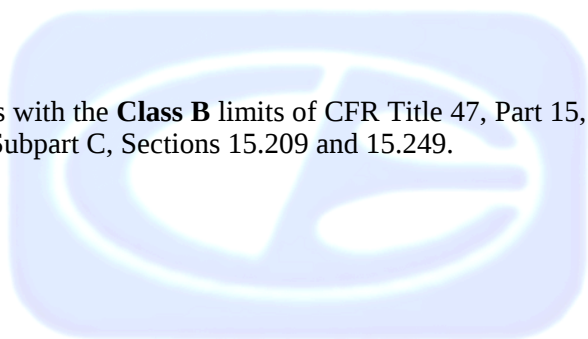
The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. 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 gun sight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the 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 from 30 MHz to 25 GHz and at a 10-meter distance from 10 kHz to 30 MHz 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 ResultsTable 1.0 RADIATED EMISSION RESULTS
2.4 GHz Wand, Model: 0000054

Frequency MHz	Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
4960 (V) (X-Axis)	53.92 (A)	54.00	-0.08
4810 (H) (Z-Axis)	53.21 (A)	54.00	-0.79
4960 (H) (X-Axis)	53.07 (A)	54.00	-0.93
4810 (H) (X-Axis)	52.74 (A)	54.00	-1.26
4890 (H) (Z-Axis)	52.71 (A)	54.00	-1.29
4890 (V) (X-Axis)	52.66 (A)	54.00	-1.34

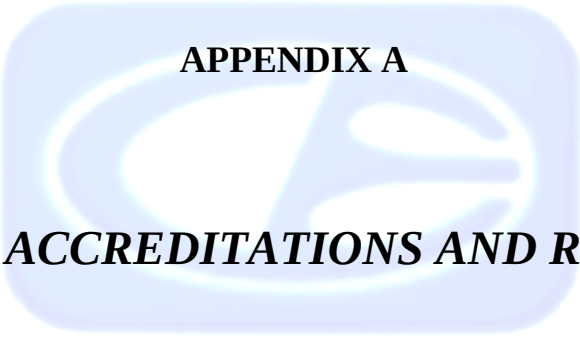
Notes:

- * The complete emissions data is given in Appendix E of this report.
- A Average Reading
- V Vertical
- H Horizontal

8. CONCLUSIONS

The 2.4 GHz Wand, Model: 0000054 (EUT), as tested, meets all of the Class B specification limits defined in CFR Title 47, Part 15, Subpart B for the digital 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

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

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 fulfillment 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>

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 modifications 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

2.4 GHz Wand
Model: 0000054
S/N: 1112070

ALSO APPROVED UNDER THIS REPORT:

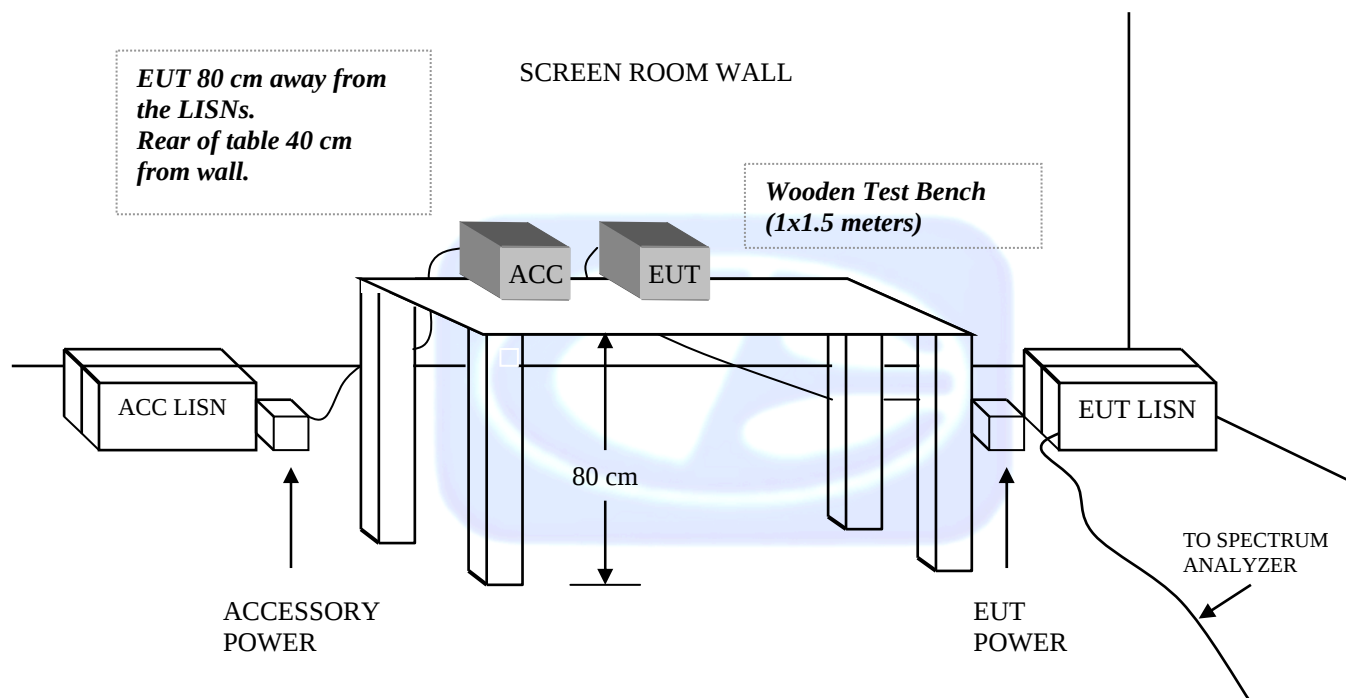
There were no additional models covered under this report.



APPENDIX D

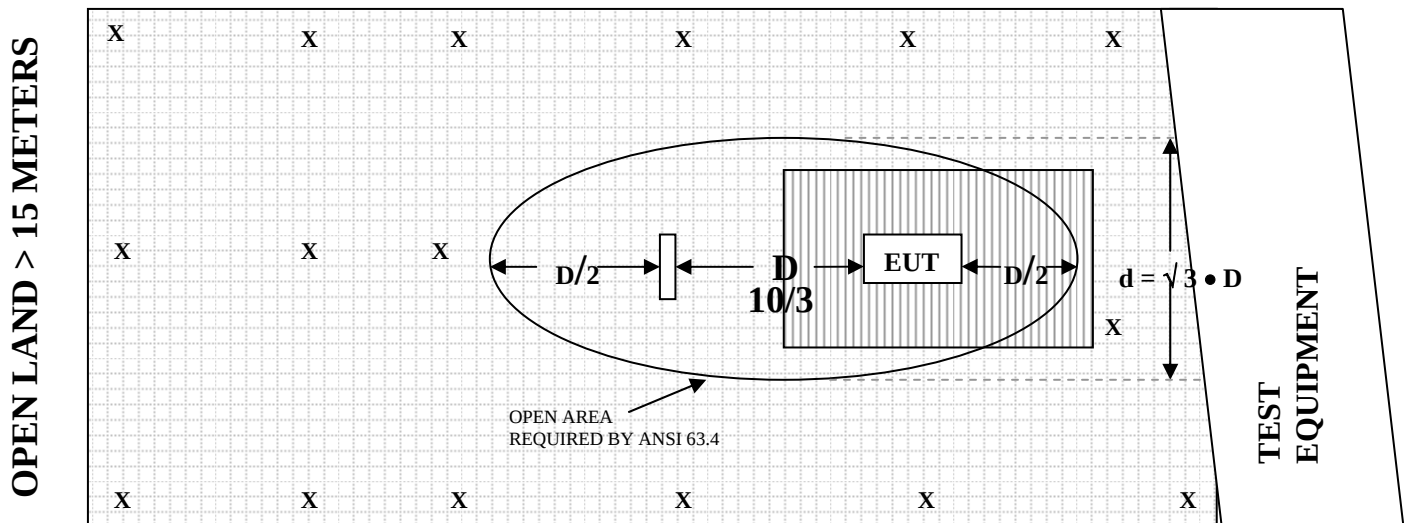
DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP



**FIGURE 2: PLOT MAP AND LAYOUT OF
THE RADIATED TEST SITE**

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS

X	= GROUND RODS		= GROUND SCREEN
D	= TEST DISTANCE (meters)		= WOOD COVER

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	300	19.00
90	7.00		

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: FEBRUARY 29, 2012**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	23.6	10000	37.7
1500	22.0	10500	38.4
2000	28.7	11000	38.0
2500	29.3	11500	38.2
3000	30.6	12000	39.0
3500	30.4	12500	42.4
4000	31.1	13000	40.8
4500	33.4	13500	40.0
5000	35.3	14000	39.7
5500	35.1	14500	43.5
6000	36.9	15000	42.7
6500	37.4	15500	39.7
7000	37.6	16000	39.2
7500	36.2	16500	39.7
8000	38.4	17000	42.2
8500	39.3	17500	47.6
9000	37.4	18000	51.2
9500	38.0		

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: DECEMBER 28, 2011

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.54	300	38.45
40	38.53	350	38.47
50	38.57	400	38.36
60	38.54	450	38.07
70	38.54	500	38.31
80	38.54	550	38.37
90	38.54	600	38.28
100	38.53	650	38.19
125	38.51	700	38.24
150	38.43	750	37.88
175	38.56	800	37.94
200	38.50	850	37.65
225	38.46	900	37.50
250	38.57	950	37.47
275	38.45	1000	36.86

COM-POWER PA-118**PREAMPLIFIER****S/N: 181656****CALIBRATION DATE: DECEMBER 28, 2011**

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.22	10.0	24.66
1.5	26.31	10.5	25.22
2.0	27.40	11.0	25.17
2.5	26.52	11.5	24.47
3.0	27.35	12.0	25.29
3.5	29.02	12.5	26.03
4.0	28.51	13.0	24.11
4.5	26.62	13.5	24.28
5.0	27.13	14.0	25.81
5.5	27.29	14.5	25.45
6.0	26.72	15.0	25.36
6.5	25.62	15.5	26.76
7.0	25.25	16.0	28.09
7.5	24.23	16.5	23.23
8.0	23.72	17.0	26.58
8.5	24.91	17.5	27.45
9.0	25.73	18.0	27.53
9.5	24.79		

COM-POWER PA-840
MICROWAVE PREAMPLIFIER

S/N: 711919

CALIBRATION DATE: MARCH 11, 2010

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	28.05	29.5	23.78
18.5	28.35	30.0	21.88
19.0	28.27	30.5	23.42
19.5	28.62	31.0	21.24
20.0	28.67	31.5	22.69
20.5	27.96	32.0	21.59
21.0	27.76	32.5	21.09
21.5	26.91	33.0	21.22
22.0	27.19	33.5	21.38
22.5	26.90	34.0	20.21
23.0	26.90	34.5	20.89
23.5	26.43	35.0	20.18
24.0	26.75	35.5	21.23
24.5	24.96	36.0	20.99
25.0	26.56	36.5	21.09
25.5	24.75	37.0	14.63
26.0	25.13	37.5	16.74
26.5	24.79	38.0	22.62
27.0	24.54	38.5	24.14
27.5	23.72	39.0	25.97
28.0	24.34	39.5	27.40
28.5	24.01	40.0	22.69
29.0	24.96		



FRONT VIEW

OBLONG INDUSTRIES, INC.
2.4 GHZ WAND
MODEL: 0000054
FCC SUBPART B AND C – RADIATED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

OBLONG INDUSTRIES, INC.
2.4 GHZ WAND
MODEL: 0000054
FCC SUBPART B AND C – RADIATED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4810	57.95	V	74	-16.05	Peak	2.25	135	
4810	50.99	V	54	-3.01	Avg	2.25	135	
7215	48.89	V	74	-25.11	Peak	1.25	225	
7215	36.97	V	54	-17.03	Avg	1.25	225	
9620								No Emission
9620								Detected
12025								No Emission
12025								Detected
14430								No Emission
14430								Detected
16835								No Emission
16835								Detected
19240								No Emission
19240								Detected
21645								No Emission
21645								Detected
24050								No Emission
24050								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4810	57.51	V	74	-16.49	Peak	1.25	155	
4810	49.98	V	54	-4.02	Avg	1.25	155	
7215	48.95	V	74	-25.05	Peak	1.25	135	
7215	37.37	V	54	-16.63	Avg	1.25	135	
9620								No Emission Detected
12025								No Emission Detected
14430								No Emission Detected
16835								No Emission Detected
19240								No Emission Detected
21645								No Emission Detected
24050								No Emission Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4810	54.81	V	74	-19.19	Peak	1.25	225	
4810	46.65	V	54	-7.35	Avg	1.25	225	
7215	49.42	V	74	-24.58	Peak	1.25	235	
7215	37.09	V	54	-16.91	Avg	1.25	235	
9620								No Emission Detected
12025								No Emission Detected
14430								No Emission Detected
16835								No Emission Detected
19240								No Emission Detected
21645								No Emission Detected
24050								No Emission Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4810	59.84	H	74	-14.16	Peak	3	135	
4810	52.74	H	54	-1.26	Avg	3	135	
7215	49.92	H	74	-24.08	Peak	1.25	225	
7215	37.37	H	54	-16.63	Avg	1.25	225	
9620								No Emission
9620								Detected
12025								No Emission
12025								Detected
14430								No Emission
14430								Detected
16835								No Emission
16835								Detected
19240								No Emission
19240								Detected
21645								No Emission
21645								Detected
24050								No Emission
24050								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4810	56.07	H	74	-17.93	Peak	3	135	
4810	49.95	H	54	-4.05	Avg	3	135	
7215	50.06	H	74	-23.94	Peak	2.25	135	
7215	37.04	H	54	-16.96	Avg	2.25	135	
9620								No Emission
9620								Detected
12025								No Emission
12025								Detected
14430								No Emission
14430								Detected
16835								No Emission
16835								Detected
19240								No Emission
19240								Detected
21645								No Emission
21645								Detected
24050								No Emission
24050								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4810	59.75	H	74	-14.25	Peak	1.25	225	
4810	53.21	H	54	-0.79	Avg	1.25	225	
7215	48.84	H	74	-25.16	Peak	1.35	265	
7215	36.87	H	54	-17.13	Avg	1.35	265	
9620								No Emission
9620								Detected
12025								No Emission
12025								Detected
14430								No Emission
14430								Detected
16835								No Emission
16835								Detected
19240								No Emission
19240								Detected
21645								No Emission
21645								Detected
24050								No Emission
24050								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4890	58.16	V	74	-15.84	Peak	1	125	
4890	52.66	V	54	-1.34	Avg	1	125	
7335	48.38	V	74	-25.62	Peak	1.25	155	
7335	36.56	V	54	-17.44	Avg	1.25	155	
9780								No Emission
9780								Detected
12225								No Emission
12225								Detected
14670								No Emission
14670								Detected
17115								No Emission
17115								Detected
19560								No Emission
19560								Detected
22005								No Emission
22005								Detected
24450								No Emission
24450								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4890	58.11	V	74	-15.89	Peak	1.25	155	
4890	50.81	V	54	-3.19	Avg	1.25	155	
7335	48.67	V	74	-25.33	Peak	1.35	145	
7335	36.53	V	54	-17.47	Avg	1.35	145	
9780								No Emission
9780								Detected
12225								No Emission
12225								Detected
14670								No Emission
14670								Detected
17115								No Emission
17115								Detected
19560								No Emission
19560								Detected
22005								No Emission
22005								Detected
24450								No Emission
24450								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4890	57.46	V	74	-16.54	Peak	1.25	155	
4890	48.21	V	54	-5.79	Avg	1.25	155	
7335	57.58	V	74	-16.42	Peak	1.35	165	
7335	44.25	V	54	-9.75	Avg	1.35	165	
9780								No Emission
9780								Detected
12225								No Emission
12225								Detected
14670								No Emission
14670								Detected
17115								No Emission
17115								Detected
19560								No Emission
19560								Detected
22005								No Emission
22005								Detected
24450								No Emission
24450								Detected

FCC 15.249Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand AloneDate: 05/07/2012
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
4890	58.57	H	74	-15.43	Peak	1.25	255	
4890	51.36	H	54	-2.64	Avg	1.25	255	
7335	46.74	H	74	-27.26	Peak	1.35	265	
7335	36.55	H	54	-17.45	Avg	1.35	265	
9780								No Emission
9780								Detected
12225								No Emission
12225								Detected
14670								No Emission
14670								Detected
17115								No Emission
17115								Detected
19560								No Emission
19560								Detected
22005								No Emission
22005								Detected
24450								No Emission
24450								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4890	57.31	H	74	-16.69	Peak	1.25	255	
4890	49.26	H	54	-4.74	Avg	1.25	255	
7335	48.89	H	74	-25.11	Peak	1.35	265	
7335	36.71	H	54	-17.29	Avg	1.35	265	
9780								No Emission
9780								Detected
12225								No Emission
12225								Detected
14670								No Emission
14670								Detected
17115								No Emission
17115								Detected
19560								No Emission
19560								Detected
22005								No Emission
22005								Detected
24450								No Emission
24450								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4890	60.22	H	74	-13.78	Peak	1.25	155	
4890	52.71	H	54	-1.29	Avg	1.25	155	
7335	55.88	H	74	-18.12	Peak	1.25	165	
7335	44.01	H	54	-9.99	Avg	1.25	165	
9780								No Emission
9780								Detected
12225								No Emission
12225								Detected
14670								No Emission
14670								Detected
17115								No Emission
17115								Detected
19560								No Emission
19560								Detected
22005								No Emission
22005								Detected
24450								No Emission
24450								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4960	61.92	V	74	-12.08	Peak	1.25	225	
4960	53.92	V	54	-0.08	Avg	1.25	225	
7440	49.16	V	74	-24.84	Peak	1.35	235	
7440	36.53	V	54	-17.47	Avg	1.35	235	
9920								No Emission
9920								Detected
12400								No Emission
12400								Detected
14880								No Emission
14880								Detected
17360								No Emission
17360								Detected
19840								No Emission
19840								Detected
22320								No Emission
22320								Detected
24800								No Emission
24800								Detected

FCC 15.249Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand AloneDate: 05/07/2012
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
4960	61.71	V	74	-12.29	Peak	2.25	225	
4960	52.18	V	54	-1.82	Avg	2.25	225	
7440	49.14	V	74	-24.86	Peak	1.25	125	
7440	36.39	V	54	-17.61	Avg	1.25	125	
9920								No Emission
9920								Detected
12400								No Emission
12400								Detected
14880								No Emission
14880								Detected
17360								No Emission
17360								Detected
19840								No Emission
19840								Detected
22320								No Emission
22320								Detected
24800								No Emission
24800								Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4960	58.82	V	74	-15.18	Peak	1.25	255	
4960	51.92	V	54	-2.08	Avg	1.25	255	
7440	49.69	V	74	-24.31	Peak	1.25	215	
7440	36.49	V	54	-17.51	Avg	1.25	215	
9920								No Emission
9920								Detected
12400								No Emission
12400								Detected
14880								No Emission
14880								Detected
17360								No Emission
17360								Detected
19840								No Emission
19840								Detected
22320								No Emission
22320								Detected
24800								No Emission
24800								Detected

FCC 15.249Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand AloneDate: 05/07/2012
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
4960	59.54	H	74	-14.46	Peak	1.25	225	
4960	53.07	H	54	-0.93	Avg	1.25	225	
7440	48.82	H	74	-25.18	Peak	1.58	235	
7440	36.41	H	54	-17.59	Avg	1.58	235	
9920								No Emission Detected
9920								
12400								No Emission Detected
12400								
14880								No Emission Detected
14880								
17360								No Emission Detected
17360								
19840								No Emission Detected
19840								
22320								No Emission Detected
22320								
24800								No Emission Detected
24800								

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4960	57.65	H	74	-16.35	Peak	2	150	
4960	50.77	H	54	-3.23	Avg	2	150	
7440	48.05	H	74	-25.95	Peak	1.25	225	
7440	36.49	H	54	-17.51	Avg	1.25	225	
9920								No Emission Detected
12400								No Emission Detected
14880								No Emission Detected
17360								No Emission Detected
19840								No Emission Detected
22320								No Emission Detected
24800								No Emission Detected

FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
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
4960	58.41	H	74	-15.59	Peak	1.25	155	
4960	51.87	H	54	-2.13	Avg	1.25	155	
7440	49.12	H	74	-24.88	Peak	1.25	155	
7440	36.29	H	54	-17.71	Avg	1.25	155	
9920								No Emission Detected
9920								
12400								No Emission Detected
12400								
14880								No Emission Detected
14880								
17360								No Emission Detected
17360								
19840								No Emission Detected
19840								
22320								No Emission Detected
22320								
24800								No Emission Detected
24800								

BAND EDGES



FCC 15.249

Oblong Industries, Inc.

2.4 GHz Wand

Model: 0000054

Configuration: Stand Alone

Date: 05/07/2012

Lab: B

Tested By: Kyle Fujimoto

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
2405	94.34	V	114	-19.66	Peak	2.25	225	Fundamental of Low Channel
2405	90	V	94	-4	Avg	2.25	225	@ 3 meters
2400	57.02	V	74	-16.98	Peak	2.25	225	No Marker Delta Method
2400	46.64	V	54	-7.36	Avg	2.25	225	Method Used
2480	92.24	V	114	-21.76	Peak	2.25	180	Fundamental of High Channel
2480	87.75	V	94	-6.25	Avg	2.25	180	@ 3 meters
2483.5	61.72	V	74	-12.28	Peak	2.25	180	No Marker Delta Method
2483.5	52.07	V	54	-1.93	Avg	2.25	180	Method Used

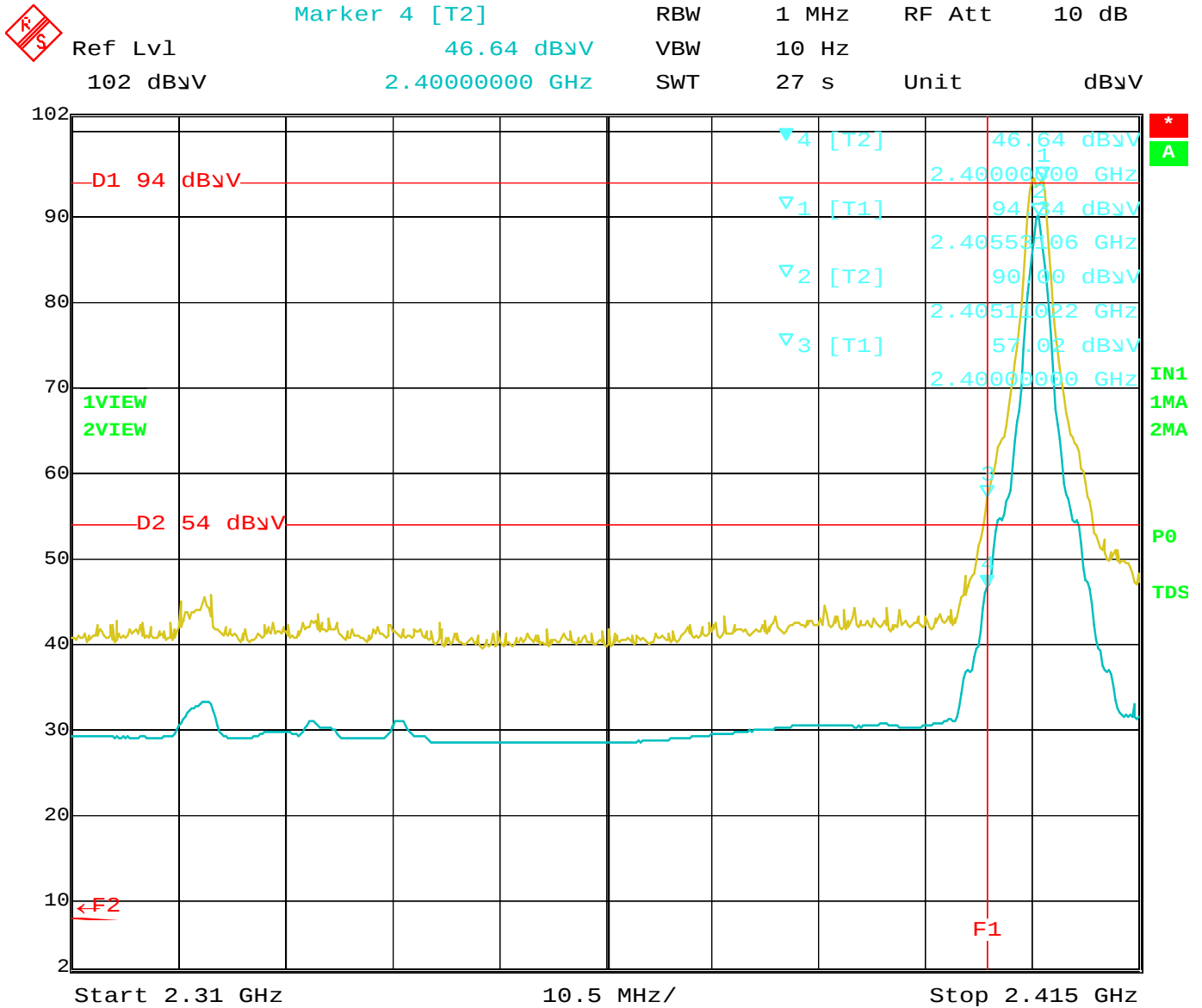
FCC 15.249

Oblong Industries, Inc.
2.4 GHz Wand
Model: 0000054
Configuration: Stand Alone

Date: 05/07/2012
Lab: B
Tested By: Kyle Fujimoto

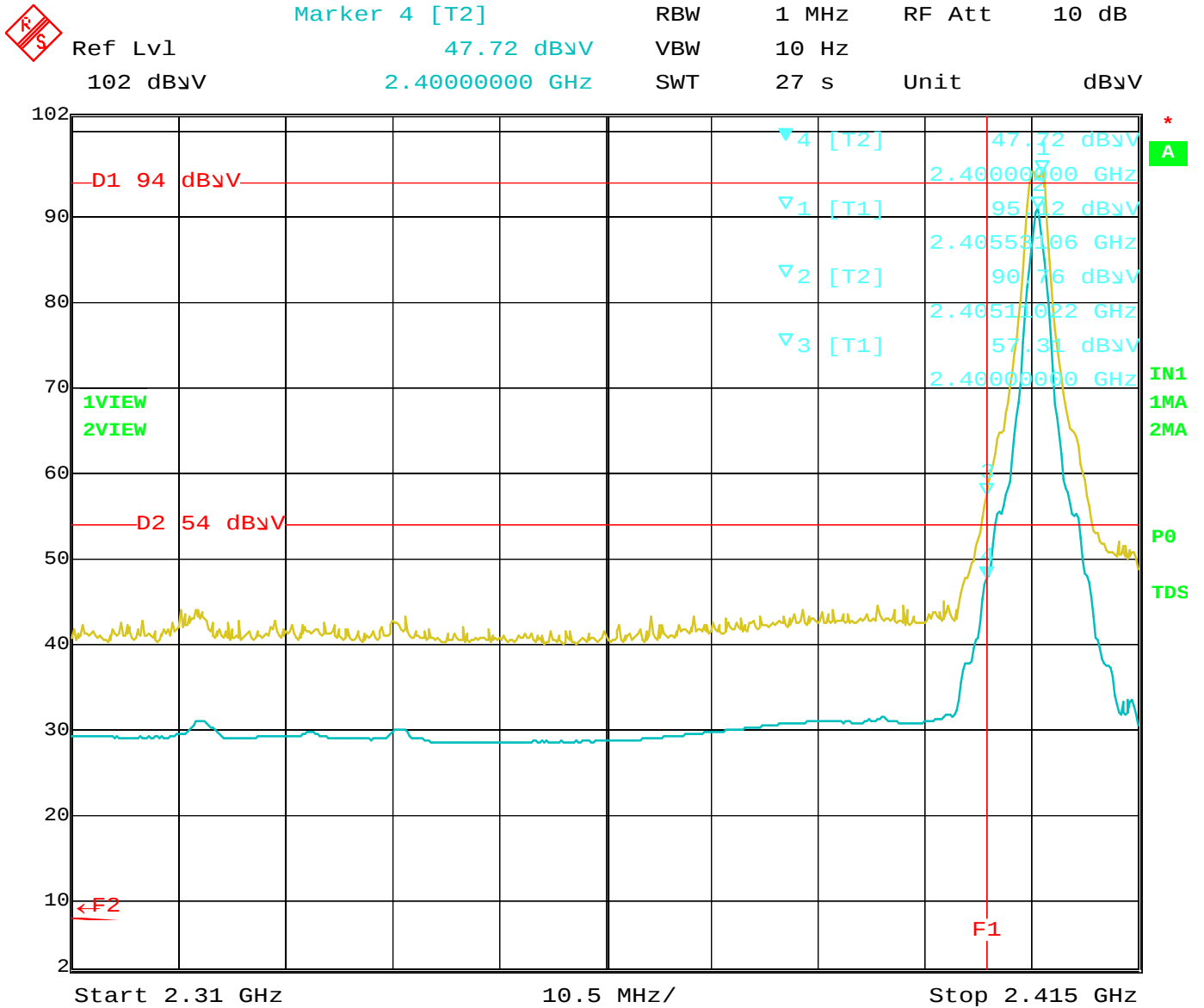
Z-Axis (Worst Case) - Low Channel
X-Axis (Worst Case) - High Channel

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2405	95.12	H	114	-18.88	Peak	1.25	225	Fundamental of Low Channel
2405	90.76	H	94	-3.24	Avg	1.25	225	@ 3 meters
2400	57.31	H	74	-16.69	Peak	1.25	225	No Marker Delta Method
2400	47.72	H	54	-6.28	Avg	1.25	225	Method Used
2480	90.12	H	114	-23.88	Peak	1.25	225	Fundamental of High Channel
2480	85.46	H	94	-8.54	Avg	1.25	225	@ 3 meters
2483.5	59.46	H	74	-14.54	Peak	1.25	225	No Marker Delta Method
2483.5	49.88	H	54	-4.12	Avg	1.25	225	Method Used



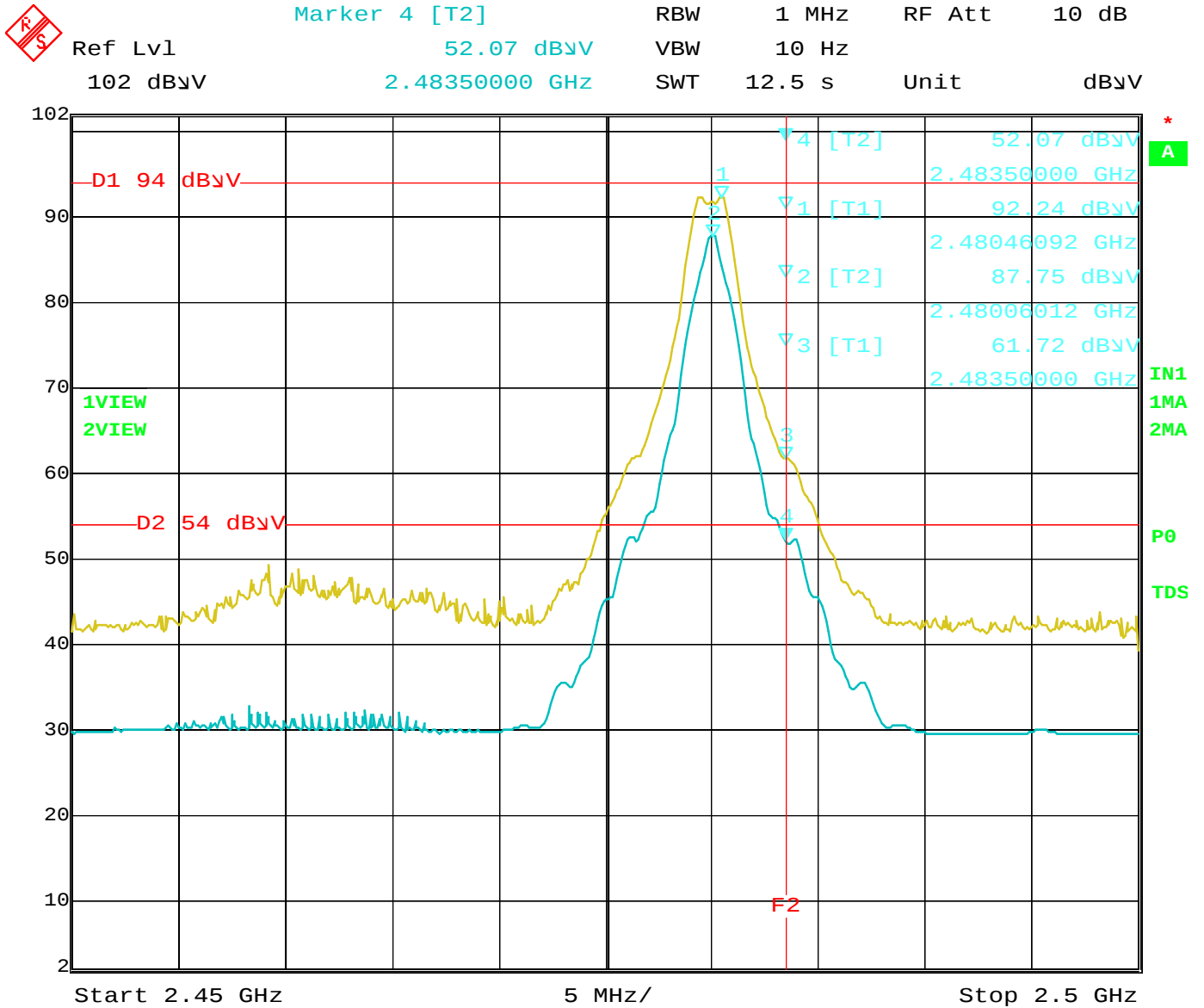
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Band Edge – Low Channel – Vertical Polarization – Y-Axis Worst Case



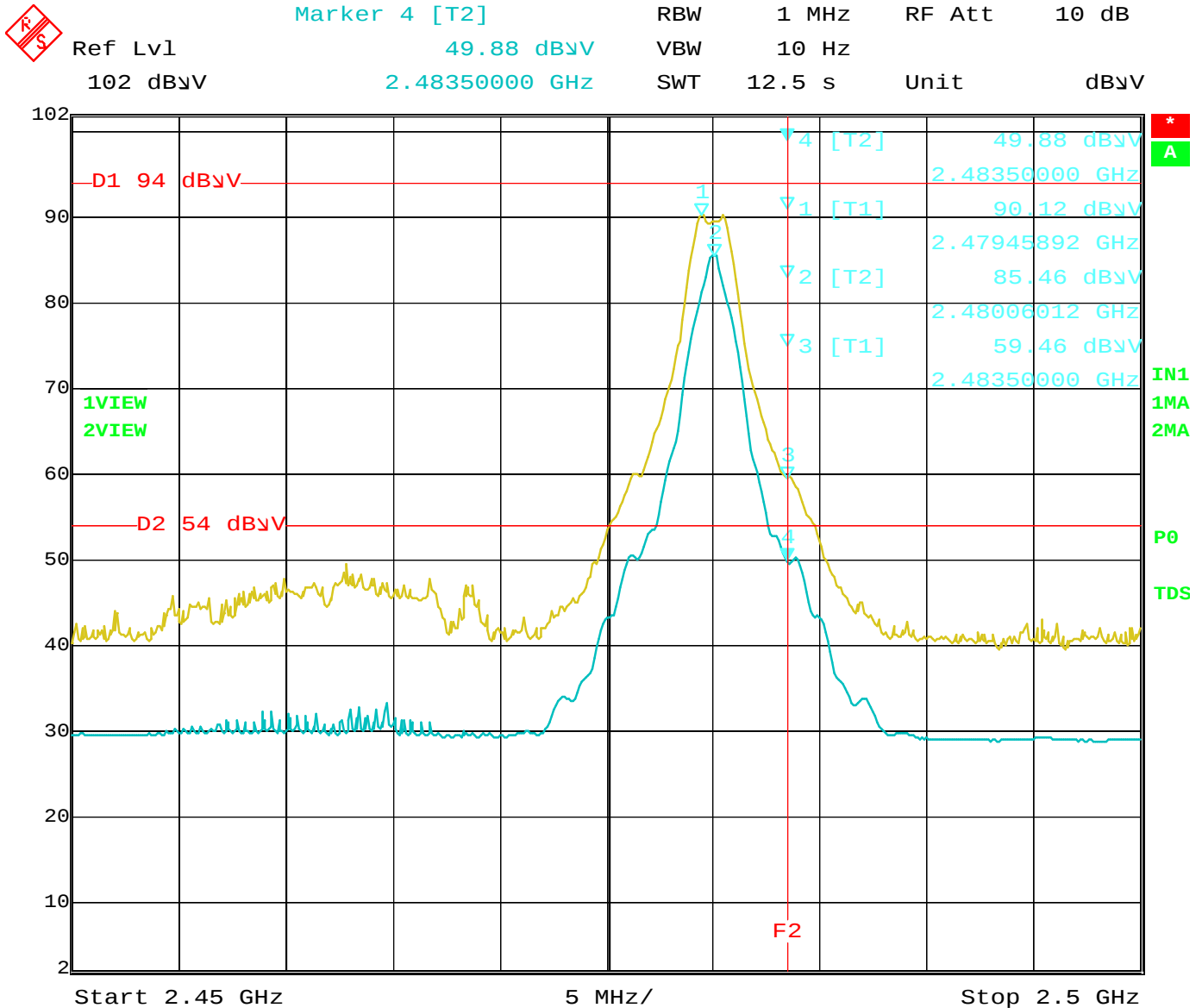
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Band Edge – Low Channel – Horizontal Polarization – Z-Axis Worst Case



Date: 7.MAY.2012 14:51:51

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



Date: 7.MAY.2012 15:24:26

Band Edge – High Channel – Horizontal Polarization – X-Axis Worst Case