FCC PART 15, SUBPART B
FCC 15.231 TEST REPORT
TEST METHOD: ANSI C63.4: 2009

For

MODULAR TRANSMITTER
Model: 40105

Prepared for

LASERLINE MANUFACTURING, INC.
24 10th STREET, SUITE G
SANTA ROSA, CALIFORNIA 95401

Prepared by:_____

KYLE FUJIMOTO

Approved by:_____

JAMES ROSS

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: JULY 18, 2011

	REPORT BODY	APPENDICES					TOTAL
		A	***B***	***C***	***D***	***E***	
PAGES	20	2	2	2	11	12	**49**

TABLE OF CONTENTS

LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Accreditations and Recognitions
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Diagrams, Charts and Photos • Test Setup Diagrams • Antenna and Amplifier Gain Factors • Radiated and Conducted Emissions Photos
E	Data Sheets

LIST OF TABLES

TABLE	TITLE
1	Radiated Emissions Test Results

LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map And Layout of Test Site
3	High Frequency Test Volume

GENERAL REPORT SUMMARY

This electromagnetic emission report is generated by Compatible Electronics Inc., 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 in any form except in full, without the written permission of Compatible Electronics.

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

Device Tested:	Modular Transmitter Model: 40105 S/N: N/A
Product Description:	Please see the expository statement.
Modifications:	The EUT was not modified during the testing.
Manufacturer:	LaserLine Manufacturing, Inc. 24 10th Street, Suite G Santa Rosa, California 95401
Test Date:	July 18, 2011
Test Specifications:	Emissions requirements CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231 Test Procedure: ANSI C63.4: 2009.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	This test was not performed because the EUT will only operate on DC power only and cannot be plugged into the AC public mains.
2	Radiated RF Emissions, 10 kHz – 4180 MHz	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; the limits of CFR Title 47, Part 15 Subpart C, 15.209 and 15.247 (d) Highest Reading in relation to spec. limit: 80.10 dBuV/m @ 418 MHz (*U = 3.59 dB)
3	20 dB Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.231

*U = Expanded Uncertainty with a coverage factor of k=2

1. PURPOSE

This document is a qualification test report based on the Emissions tests performed on the Modular Transmitter, Model: 40105. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4: 2009. 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; and Subpart C, sections 15.205, 15.209, and 15.231.

Note: for the unintentional radiator portion of the test, the EUT was within the **Class B** specification limits defined by CFR Title 47, Part 15 Subpart B.

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 92823.

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

LaserLine Manufacturing, Inc.

Bob Blick	Senior Electronics Engineer

Compatible Electronics Inc.

Kyle Fujimoto	Test Engineer
James Ross	Test Engineer

2.4 Date Test Sample was Received

The test sample was received on July 18, 2011.

2.5 Disposition of the Test Sample

The test sample was returned to LaserLine Manufacturing, Inc. on July 18, 2011.

2.6 Abbreviations and Acronyms

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

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
FCC	Federal Communications Commission
N/A	Not Applicable

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this test report.

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules - Radio frequency devices (including digital devices) – Intentional Radiators
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
FCC Title 47, Part 15 Subpart B	FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – (Emissions)

The Modular Transmitter, Model: 40105 (EUT) was connected to a 9-volt battery via 10-centimeter wires. The EUT was also directly connected to an antenna. The EUT was tested in three orthogonal axis.

The EUT was continuously transmitting.

Note: for the 5-second operation test, the EUT was placed inside a representative host device. The host device then activated once a button was pressed. This sent a transmission to the EUT that shut off within 5 seconds.

The highest emissions were found when the EUT was running in the above configuration. The cables were moved to maximize the emissions. The final radiated data was taken in this mode of operation. All initial investigations were performed with the spectrum analyzer in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix D.

4.1.1 Photograph of Test Configuration – (Emissions)

4.1.2 Cable Construction and Termination

Cable 1 This is a 10-centimeter unshielded cable connecting the EUT to the 9-volt power supply.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

#	EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID
1	MODULAR TRANSMITTER (EUT)	LASERLINE MANUFACTURING, INC.	40105	N/A	ZNS40105
2	9-VOLTA BATTERY	DURACELL	N/A	N/A	N/A
3	ANTENNA	N/A	N/A	N/A	N/A
4	LASEROMETER	TRIMBLE	HL750	75001595	N/A

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	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
RF RADIATED EMISSIONS TEST EQUIPMENT					
Radiated Emissions Data Capture Program	Compatible Electronics	2.0	N/A	N/A	N/A
Biconical Antenna	Com-Power	AB-900	15250	June 8, 2011	June 8, 2012
Log Antenna	Com-Power	AL-100	16252	June 8, 2011	June 8, 2012
Preamplifier	Com-Power	PA-102	1017	January 11, 2011	January 11, 2012
Microwave Preamplifier	Com-Power	PA-118	181656	December 22, 2010	December 22, 2011
Horn Antenna	Com-Power	AH-118	071175	March 18, 2010	March 18, 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 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 was not grounded.

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 spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. The data was collected with the spectrum analyzer 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 spectrum analyzer input stage, and the spectrum analyzer offset was adjusted accordingly to read the actual data measured. The LISN output was read by the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for the conducted emissions 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 initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 1.6 MHz, 1.6 MHz to 5 MHz, and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the computer in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave.

Test Results:

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

7.1.2 Radiated Emissions 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 above 1 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 or EMI Receiver 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 adjusted by a “duty cycle correction factor”, derived from 20 log (dwell time / 100 ms).

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 4.18 GHz	1 MHz	Horn Antenna

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: 2009. 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.

Radiated Emissions 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 10-meter test distance from 10 kHz to 30 MHz, and at a 3 meter test distance from 30 MHz to 4.18 GHz 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 15.231 for radiated emissions. Please see Appendix E for the data sheets.

7.1.3 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
MODULAR TRANSMITTER Model: 40105

Frequency MHz	Corrected Reading* dBuV/m	Spec. Limit dBuV/m	Delta dB
418.00	80.10 **(A)**	80.28	-0.18
410.00	42.02	46.00	-3.98
4180.00	37.09 **(A)**	54.00	-16.91
3762.00	36.68 **(A)**	54.00	-17.32
2926.00	41.17 **(A)**	60.28	-19.11
836.00	40.69 **(A)**	60.28	-19.59

Notes:

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

\# Quasi-Peak Reading

A Average Reading

7.2 20 dB Bandwidth

The 20 dB Bandwidth was measured using the EMI Receiver. The bandwidth was measured using a direct connection from the RF output of the EUT. The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.231 (c). The 20 dB bandwidth is less than 0.25% of the fundamental. Please see the data sheet located in Appendix D..

8. DEVIATIONS FROM THE TEST PROCEDURES

There were no deviations from the test procedures.

9. CONCLUSIONS

The Modular Transmitter, Model: 40105, as tested, meets all of the specification limits defined in FCC Title 47, Part 15, Subpart C, sections 15.205, 15.209, and 15.231.

Note: For the unintentional radiator portion of the test, the EUT was within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B.

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, Taiwan and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025 an ISO 9002 equivalent. Please follow the link to the NIST site for each of our facilities NVLAP certificate and scope of accreditation.

NVLAP listing links
Agoura Division - http://ts.nist.gov/Standards/scopes/2000630.htm
Brea Division - http://ts.nist.gov/Standards/scopes/2005280.htm
Silverado/Lake Forest Division - http://ts.nist.gov/Standards/scopes/2005270.htm

ANSI listing
CETCB
https://www.ansica.org/wwwversion2/outside/ALLdirectoryDetails.asp?menuID=1&prgID=3&orgID=123&status=4

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

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).

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

VCCI Listing, from VCCI site
Enter "Compatible" in search form http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html

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

There were no modifications made to the EUT during the test.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Modular Transmitter
Model: 40105
S/N: N/A

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

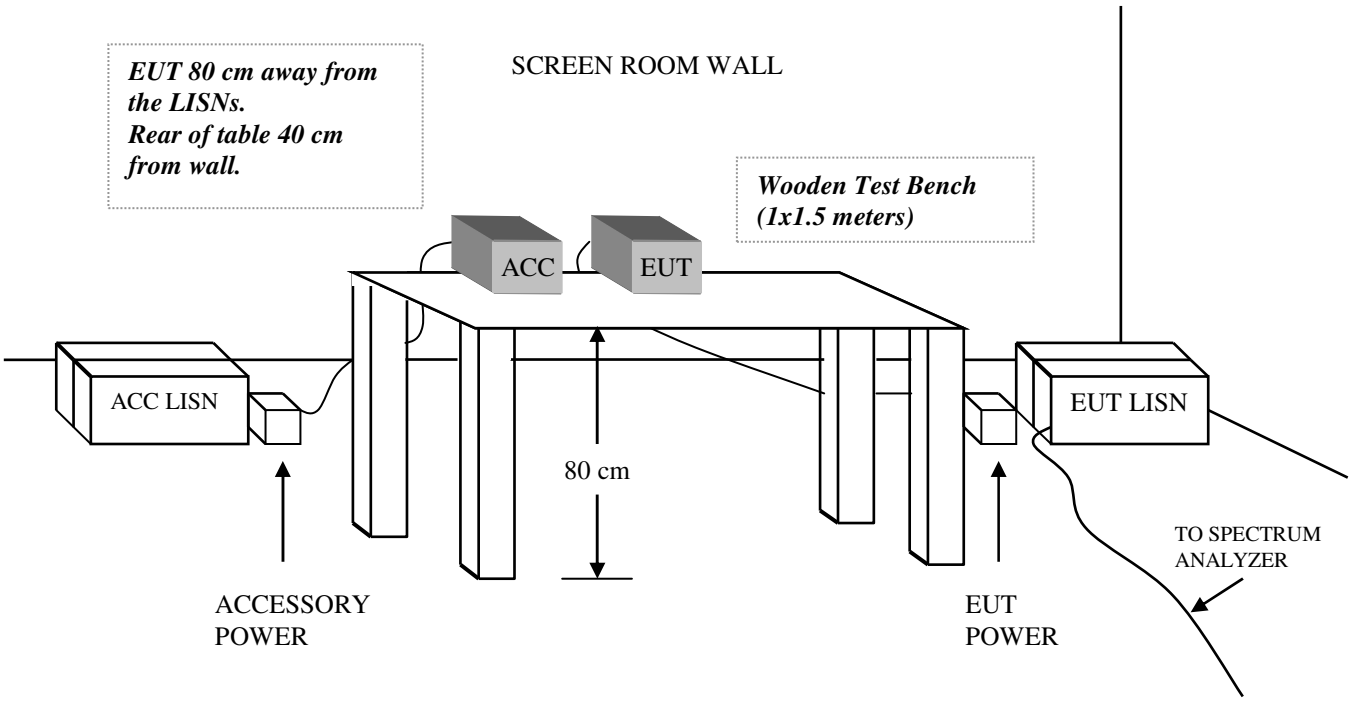


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE

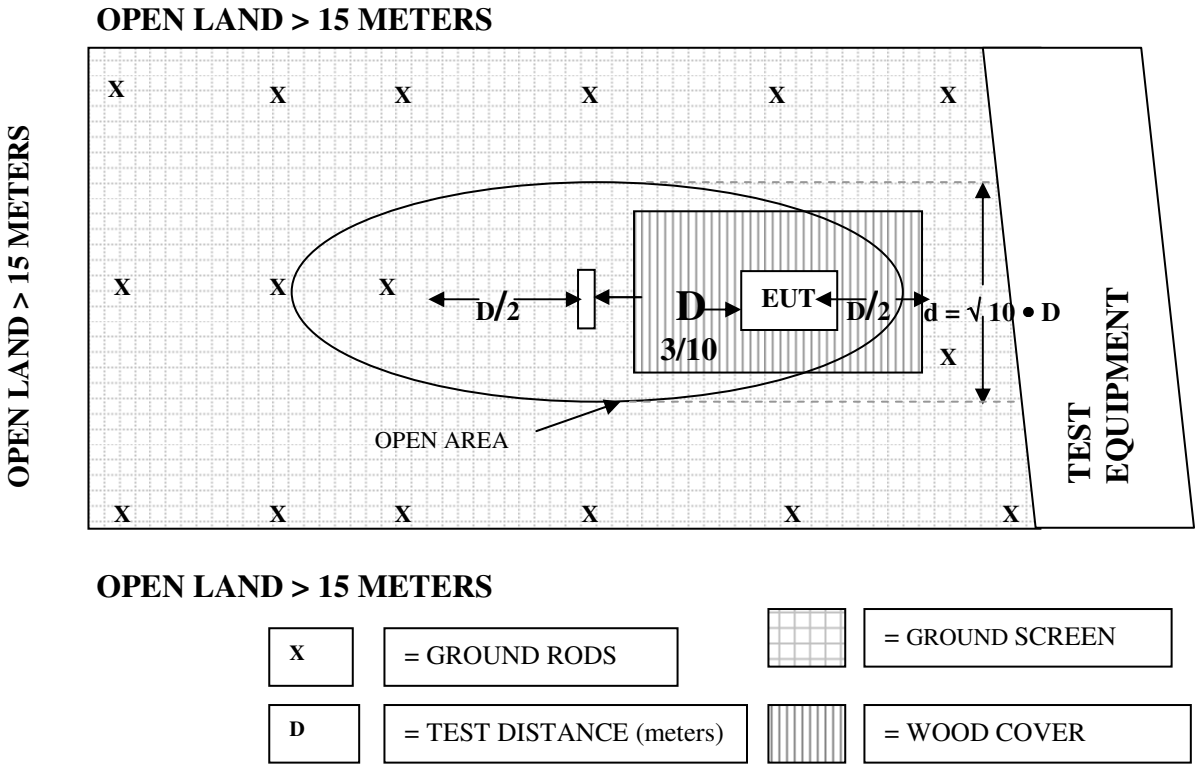
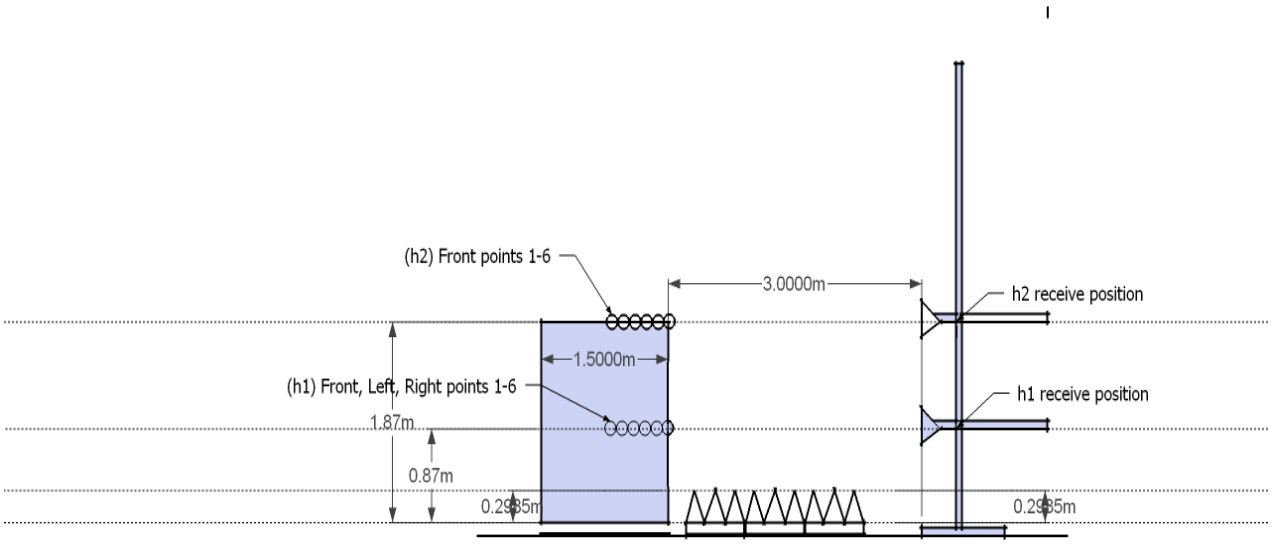


FIGURE 3: HIGH FREQUENCY TEST VOLUME



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	160	12.40
35	11.00	180	15.70
40	11.80	200	16.20
45	11.60	250	16.10
50	11.40	300	19.00
60	9.80		
70	7.00		
80	5.70		
90	7.00		
100	9.50		
120	12.10		
140	11.40		

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16252

CALIBRATION DATE: JUNE 8, 2011

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

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 AH-118

HORN ANTENNA

S/N: 071175

CALIBRATION DATE: MARCH 18, 2010

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	22.2	10000	39.8
1500	24.2	10500	40.2
2000	27.2	11000	39.7
2500	27.8	11500	39.9
3000	30.5	12000	41.7
3500	30.9	12500	42.7
4000	31.9	13000	42.3
4500	33.2	13500	40.3
5000	33.6	14000	42.6
5500	36.2	14500	43.4
6000	35.8	15000	41.9
6500	36.1	15500	40.8
7000	37.9	16000	41.0
7500	37.4	16500	41.5
8000	38.0	17000	44.5
8500	38.8	17500	47.6
9000	38.0	18000	50.8
9500	39.2		

COM-POWER PA-118

PREAMPLIFIER

S/N: 181656

CALIBRATION DATE: DECEMBER 22, 2010

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	24.90	12500	24.92
1500	26.50	13000	24.52
2000	26.79	13500	24.33
2500	26.90	14000	24.56
3000	27.03	14500	24.99
3500	26.94	15000	26.06
4000	27.18	15500	26.87
4500	26.79	16000	25.95
5000	26.25	16500	24.69
5500	26.16	17000	24.20
6000	25.52	17500	25.12
6500	25.29	18000	26.03
7000	24.45		
7500	24.18		
8000	24.02		
8500	24.54		
9000	24.91		
9500	25.42		
10000	26.07		
10500	24.97		
11000	24.79		
11500	24.33		
12000	24.24		

FRONT VIEW

LASERLINE MANUFACTURING, INC.
MODULAR TRANSMITTER
Model: 40105
RADIATED EMISSIONS – 07/18/2011

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

LASERLINE MANUFACTURING, INC.
MODULAR TRANSMITTER
Model: 40105
RADIATED EMISSIONS – 07/18/2011

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSION

DATA SHEETS

FCC 15.231
LaserLine Manufacturing, Inc.
Modular Transmitter
Model: 40105

Date: 07/18/2011
Labs: B and D
Tested By: Kyle Fujimoto

X-Axis - Fundamental and Harmonics
Duty Cycle = 47.26%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
418	82.5	V	100.28	-17.78	Peak	1.25	155	
418	76	V	80.28	-4.28	Avg	1.25	155	
836	47.19	V	80.28	-33.09	Peak	1.25	155	
836	40.69	V	60.28	-19.59	Avg	1.25	155	
1254	30.67	V	74	-43.33	Peak	1.25	155	
1254	24.17	V	54	-29.83	Avg	1.25	155	
1672	35.81	V	74	-38.19	Peak	1.35	165	
1672	29.31	V	54	-24.69	Avg	1.35	165	
2090	43.44	V	80.28	-36.84	Peak	1.25	175	
2090	36.94	V	60.28	-23.34	Avg	1.25	175	
2508	35.33	V	80.28	-44.95	Peak	1.25	185	
2508	28.83	V	60.28	-31.45	Avg	1.25	185	
2926	46.17	V	80.28	-34.11	Peak	1.25	195	
2926	39.67	V	60.28	-20.61	Avg	1.25	195	
3344	41.19	V	80.28	-39.09	Peak	1.35	205	
3344	34.69	V	60.28	-25.59	Avg	1.35	205	
3762	42.81	V	74	-31.19	Peak	1.25	215	
3762	36.31	V	54	-17.69	Avg	1.25	215	
4180	42.56	V	74	-31.44	Peak	1.35	215	
4180	36.06	V	54	-17.94	Avg	1.35	215	

FCC 15.231
LaserLine Manufacturing, Inc.
Modular Transmitter
Model: 40105

Date: 07/18/2011
Labs: B and D
Tested By: Kyle Fujimoto

X-Axis - Fundamental and Harmonics
Duty Cycle = 47.26%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
418	84.9	H	100.28	-15.38	Peak	1	90	
418	78.4	H	80.28	-1.88	Avg	1	90	
836	36.79	H	80.28	-43.49	Peak	1.25	155	
836	30.29	H	60.28	-29.99	Avg	1.25	155	
1254	30.56	H	74	-43.44	Peak	1.35	165	
1254	24.06	H	54	-29.94	Avg	1.35	165	
1672	37.11	H	74	-36.89	Peak	1.25	175	
1672	30.61	H	54	-23.39	Avg	1.25	175	
2090	39.34	H	80.28	-40.94	Peak	1.25	185	
2090	32.84	H	60.28	-27.44	Avg	1.25	185	
2508	35.75	H	80.28	-44.53	Peak	1.35	195	
2508	29.25	H	60.28	-31.03	Avg	1.35	195	
2926	45.84	H	80.28	-34.44	Peak	1.25	205	
2926	39.34	H	60.28	-20.94	Avg	1.25	205	
3344	41.27	H	80.28	-39.01	Peak	1.35	225	
3344	34.77	H	60.28	-25.51	Avg	1.35	225	
3762	41.51	H	74	-32.49	Peak	1.25	155	
3762	35.01	H	54	-18.99	Avg	1.25	155	
4180	42.06	H	74	-31.94	Peak	1.25	155	
4180	35.56	H	54	-18.44	Avg	1.25	155	

FCC 15.231

LaserLine Manufacturing, Inc.
Modular Transmitter
Model: 40105

Date: 07/18/2011
Labs: B and D
Tested By: Kyle Fujimoto

Y-Axis - Fundamental and Harmonics
Duty Cycle = 47.26%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
418	86.6	V	100.28	-13.68	Peak	1.35	155	
418	80.1	V	80.28	-0.18	Avg	1.35	155	
836	45.69	V	80.28	-34.59	Peak	1	165	
836	39.19	V	60.28	-21.09	Avg	1	165	
1254	35.13	V	74	-38.87	Peak	1.25	135	
1254	28.63	V	54	-25.37	Avg	1.25	135	
1672	37.74	V	74	-36.26	Peak	1.35	165	
1672	31.24	V	54	-22.76	Avg	1.35	165	
2090	41.64	V	80.28	-38.64	Peak	1.25	175	
2090	35.14	V	60.28	-25.14	Avg	1.25	175	
2508	37.19	V	80.28	-43.09	Peak	1.55	185	
2508	30.69	V	60.28	-29.59	Avg	1.55	185	
2926	43.44	V	80.28	-36.84	Peak	1.25	175	
2926	36.94	V	60.28	-23.34	Avg	1.25	175	
3344	41.81	V	80.28	-38.47	Peak	1.55	165	
3344	35.31	V	60.28	-24.97	Avg	1.55	165	
3762	42.47	V	74	-31.53	Peak	1.25	185	
3762	35.97	V	54	-18.03	Avg	1.25	185	
4180	42.39	V	74	-31.61	Peak	1.15	135	
4180	35.89	V	54	-18.11	Avg	1.15	135	

FCC 15.231

LaserLine Manufacturing, Inc.
Modular Transmitter
Model: 40105

Date: 07/18/2011
Labs: B and D
Tested By: Kyle Fujimoto

Y-Axis - Fundamental and Harmonics
Duty Cycle = 47.26%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
418	84.6	H	100.28	-15.68	Peak	1.25	155	
418	78.1	H	80.28	-2.18	Avg	1.25	155	
836	37.39	H	80.28	-42.89	Peak	1.65	175	
836	30.89	H	60.28	-29.39	Avg	1.65	175	
1254	27.68	H	74	-46.32	Peak	1.25	135	
1254	21.18	H	54	-32.82	Avg	1.25	135	
1672	37.69	H	74	-36.31	Peak	1.35	145	
1672	31.19	H	54	-22.81	Avg	1.35	145	
2090	46.31	H	80.28	-33.97	Peak	1.25	125	
2090	39.81	H	60.28	-20.47	Avg	1.25	125	
2508	38.29	H	80.28	-41.99	Peak	1.15	115	
2508	31.79	H	60.28	-28.49	Avg	1.15	115	
2926	45.15	H	80.28	-35.13	Peak	1.25	135	
2926	38.65	H	60.28	-21.63	Avg	1.25	135	
3344	42.41	H	80.28	-37.87	Peak	1.25	145	
3344	35.91	H	60.28	-24.37	Avg	1.25	145	
3762	40.65	H	74	-33.35	Peak	1.35	155	
3762	34.15	H	54	-19.85	Avg	1.35	155	
4180	39.09	H	74	-34.91	Peak	1.25	155	
4180	32.59	H	54	-21.41	Avg	1.25	155	

FCC 15.231

LaserLine Manufacturing, Inc.
Modular Transmitter
Model: 40105

Date: 07/18/2011
Labs: B and D
Tested By: Kyle Fujimoto

Z-Axis - Fundamental and Harmonics
Duty Cycle = 47.26%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
418	82.1	V	100.28	-18.18	Peak	1.25	165	
418	75.6	V	80.28	-4.68	Avg	1.25	165	
836	46.09	V	80.28	-34.19	Peak	1.35	175	
836	39.59	V	60.28	-20.69	Avg	1.35	175	
1254	32.79	V	74	-41.21	Peak	1.25	185	
1254	26.29	V	54	-27.71	Avg	1.25	185	
1672	38.04	V	74	-35.96	Peak	1.35	195	
1672	31.54	V	54	-22.46	Avg	1.35	195	
2090	43.15	V	80.28	-37.13	Peak	1.25	205	
2090	36.65	V	60.28	-23.63	Avg	1.25	205	
2508	38.79	V	80.28	-41.49	Peak	1.35	125	
2508	32.29	V	60.28	-27.99	Avg	1.35	125	
2926	45.05	V	80.28	-35.23	Peak	1.25	155	
2926	38.55	V	60.28	-21.73	Avg	1.25	155	
3344	41.92	V	80.28	-38.36	Peak	1.35	165	
3344	35.42	V	60.28	-24.86	Avg	1.35	165	
3762	42.11	V	74	-31.89	Peak	1.25	175	
3762	35.61	V	54	-18.39	Avg	1.25	175	
4180	40.01	V	74	-33.99	Peak	1.25	185	
4180	33.51	V	54	-20.49	Avg	1.25	185	

FCC 15.231

LaserLine Manufacturing, Inc.
Modular Transmitter
Model: 40105

Date: 07/18/2011
Labs: B and D
Tested By: Kyle Fujimoto

Z-Axis - Fundamental and Harmonics
Duty Cycle = 47.26%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
418	84.9	H	100.28	-15.38	Peak	1	175	
418	78.4	H	80.28	-1.88	Avg	1	175	
836	39.39	H	80.28	-40.89	Peak	1.25	165	
836	32.89	H	60.28	-27.39	Avg	1.25	165	
1254	33.38	H	74	-40.62	Peak	1.25	175	
1254	26.88	H	54	-27.12	Avg	1.25	175	
1672	40.02	H	74	-33.98	Peak	1.25	185	
1672	33.52	H	54	-20.48	Avg	1.25	185	
2090	46.82	H	80.28	-33.46	Peak	1.35	195	
2090	40.32	H	60.28	-19.96	Avg	1.35	195	
2508	34.88	H	80.28	-45.4	Peak	1.25	205	
2508	28.38	H	60.28	-31.9	Avg	1.25	205	
2926	47.67	H	80.28	-32.61	Peak	1.25	155	
2926	41.17	H	60.28	-19.11	Avg	1.25	155	
3344	40.86	H	80.28	-39.42	Peak	1.25	165	
3344	34.36	H	60.28	-25.92	Avg	1.25	165	
3762	43.18	H	74	-30.82	Peak	1.35	175	
3762	36.68	H	54	-17.32	Avg	1.35	175	
4180	43.59	H	74	-30.41	Peak	1.25	185	
4180	37.09	H	54	-16.91	Avg	1.25	185	

FCC 15.231
LaserLine Manufacturing, Inc.
Modular Transmitter
Model: 40105

Date: 07/18/2011
Labs: B and D
Tested By: Kyle Fujimoto

Non-Harmonic Emissions From the Transmitter
Digital Portion From the EUT
Duty Cycle = 47.26%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Non-Harmonic Emissions
								Found for the EUT from
								10 kHz to 4.18 GHz for
								Vertical and Horizontal
								Polarizations
								No Emissions
								Found for the EUT from
								10 kHz to 4.18 GHz for
								Vertical and Horizontal
								Polarizations
								For the Digital Portion
								Tested in the X, Y, and
								Z-Axis

FCC 15.231
LaserLine Manufacturing, Inc.
Modular Transmitter
Model: 40105

Date: 07/18/2011
Labs: B and D
Tested By: Kyle Fujimoto

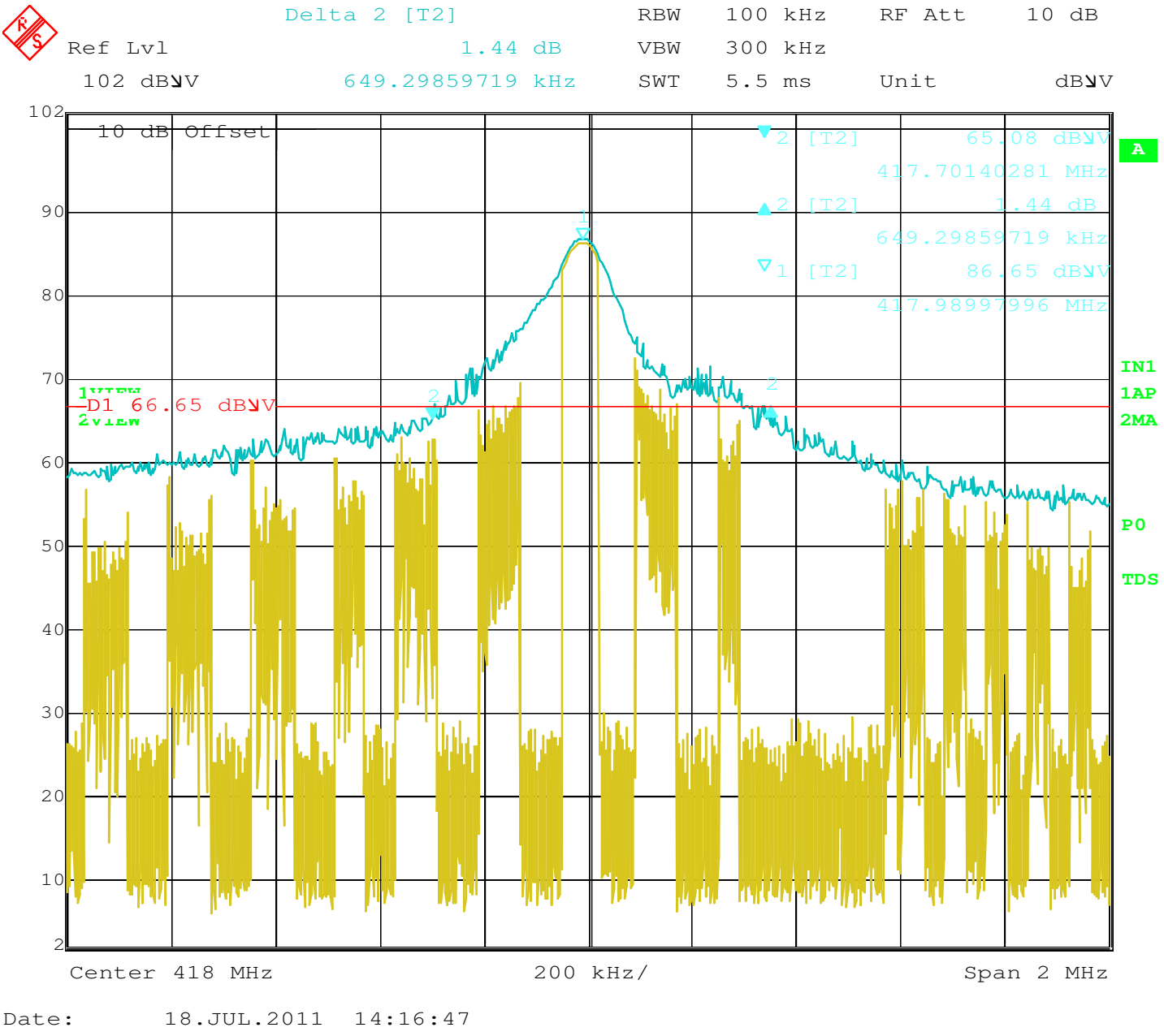
Band Edge at 410 MHz

Duty Cycle = 47.26%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
410	42.02	H	46	-3.98	Peak	1.25	165	X-Axis Worst Case
410	41.23	V	46	-4.77	Peak	1.25	165	Y-Axis Worse Case

-20 dB BANDWIDTH

DATA SHEET



-20 dB Bandwidth of the Fundamental