

**FCC PART 15 SUBPART B and C
TEST REPORT**

for

LOW PROFILE TRANSMITTER

MODEL: TX10K-LP

Prepared for

BINSFELD ENGINEERING, INC
4571 WEST MACFARLANE ROAD
MAPLE CITY, MICHIGAN 49664

Prepared by: 

KYLE FUJIMOTO

Approved by: 

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BREA, CALIFORNIA 92823
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DATE: OCTOBER 1, 2012

	REPORT BODY	APPENDICES					TOTAL
		<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	
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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: Low Profile Transmitter
Model: TX10K-LP
S/N: N/A

Product Description: See Expository Statement

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

Customer: Binsfeld Engineering, Inc
4571 West MacFarlane Road
Maple City, Michigan 49664

Test Date(s): August 17, 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 only and cannot be plugged into the AC public mains.
2	Radiated RF Emissions 10 kHz to 9300 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 Low Profile Transmitter, Model: TX10K-LP. 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

Binsfeld Engineering, Inc

Dave Tietz R&D Director

Compatible Electronics Inc.

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 Low Profile Transmitter Model:TX10K-LP (EUT) was connected to a battery and bridge simulator. The EUT was tested in three orthogonal axis. The EUT was continuously transmitting.

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

Cable 1 This is a 1-meter unshielded cable connecting the EUT's +B port to the battery. The cable is hard wired at each end.

Cable 2 This is a 1-meter unshielded cable connecting the EUT's -B port to the battery. The cable is hard wired at each end.

Cable 3 This is a 1-meter unshielded cable connecting the EUT's +E port to the bridge simulator. The cable is hard wired at each end.

Cable 4 This is a 1-meter unshielded cable connecting the EUT's -E port to the bridge simulator. The cable is hard wired at each end.

Cable 5 This is a 1-meter unshielded cable connecting the EUT's +S port to the bridge simulator. The cable is hard wired at each end.

Cable 6 This is a 1-meter unshielded cable connecting the EUT's -S port to the bridge simulator. The cable is hard wired at each end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
LOW PROFILE TRANSMITTER (EUT)	BINSFELD ENGINEERING, INC.	TX10K-LP	N/A	HWN-TX10K-LP
BRIDGE SIMULATOR	BINSFELD ENGINEERING, INC.	BS900	N/A	N/A

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANUFACTURER	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	8568B	2517A01563	May 30, 2012	May 30, 2013
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	2648A15285	May 30, 2012	May 30, 2013
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	May 30, 2012	May 30, 2013
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, 2013
Biconical Antenna	Com Power	AB-900	43028	May 24, 2012	May 24, 2013
Log Periodic Antenna	Com Power	AL-100	16252	May 24, 2012	May 24, 2013
Horn Antenna	Com-Power	AH-118	071175	February 29, 2012	March 1, 2014
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
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 was 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, 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 9.3 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 9.3 GHz	1 MHz	Horn Antennas

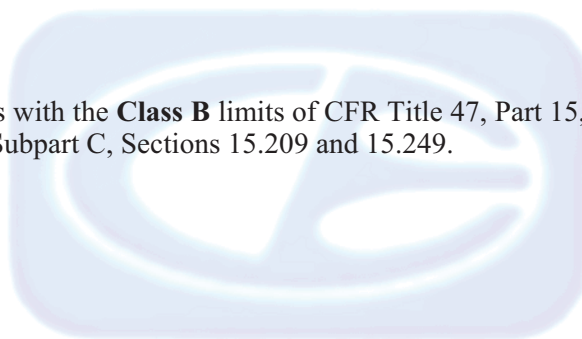
The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. 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 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 from 30 MHz to 9.3 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 15.249.



7.1.3 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
Low Profile Transmitter, Model: TX10K-LP

Frequency MHz	Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
1805.16 (H) (Z-Axis)	50.83 (A)	54.00	-3.17
914.58 (V) (Y-Axis)	90.51 (Quasi-Peak)	94.00	-3.49
1829.17 (H) (Y-Axis)	50.49 (A)	54.00	-3.51
1850.2 (H) (Z-Axis)	49.45 (A)	54.00	-4.55
2775.3 (V) (Y-Axis)	49.41 (A)	54.00	-4.59
1829.17 (V) (Y-Axis)	49.27 (A)	54.00	-4.73

Notes:

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

8. CONCLUSIONS

The Low Profile Transmitter, Model: TX10K-LP (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) <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>

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

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

Low Profile Transmitter
Model: TX10K-LP
S/N: N/A

ALSO APPROVED UNDER THIS REPORT:

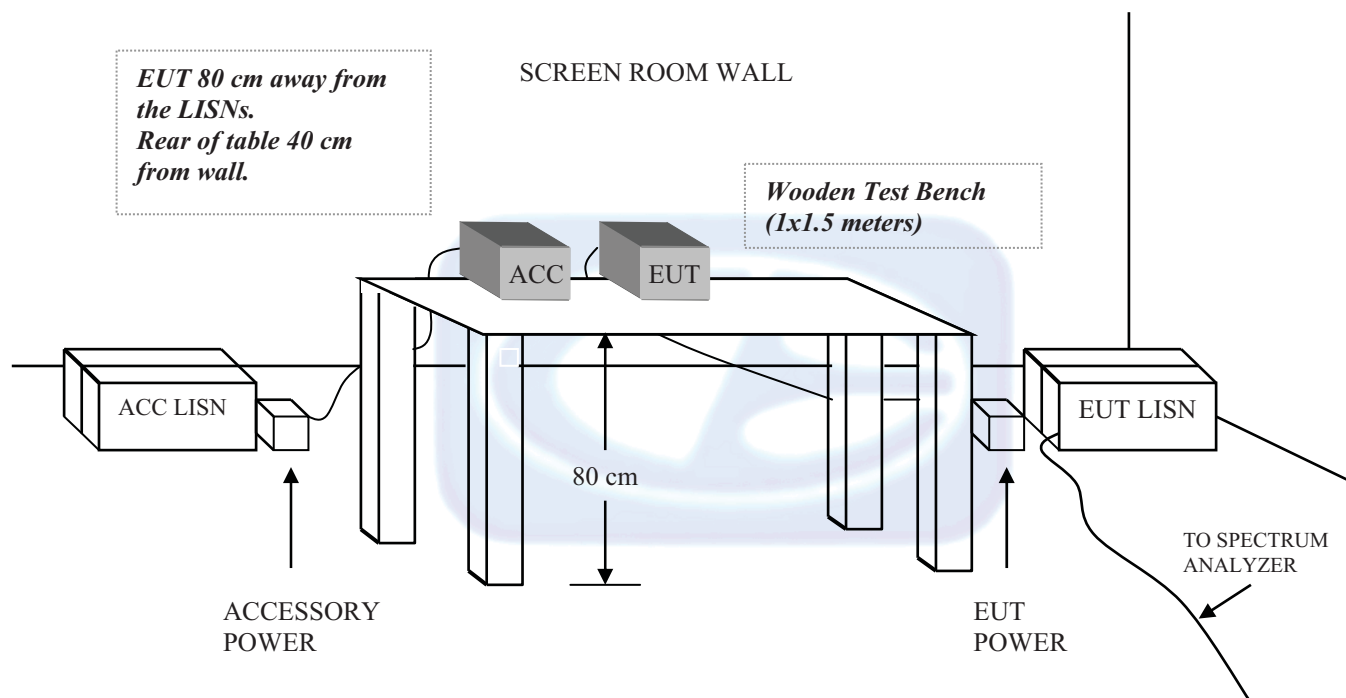
There were no additional models covered under this report.



APPENDIX D

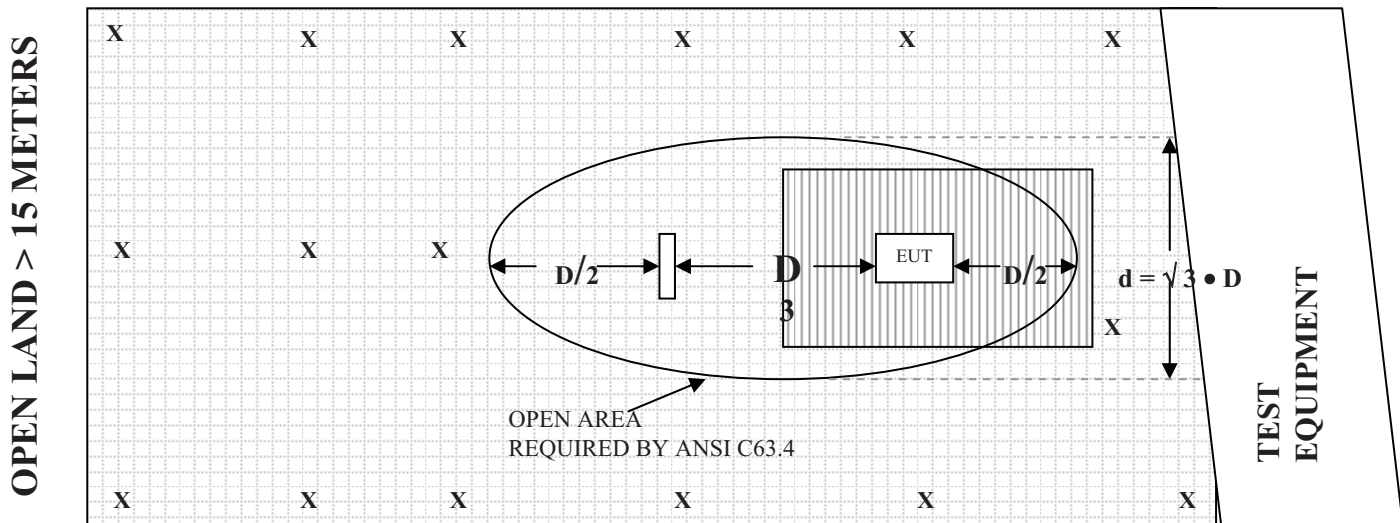
DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP



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

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: 43028****CALIBRATION DATE: MAY 24, 2012**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	11.80	120	13.20
35	11.20	125	13.30
40	11.90	140	11.60
45	10.70	150	11.80
50	11.40	160	12.70
60	10.30	175	14.80
70	7.60	180	15.70
80	5.70	200	15.80
90	7.90	250	14.80
100	10.7	300	19.80

COM-POWER AL-100**LOG PERIODIC ANTENNA****S/N: 16252****CALIBRATION DATE: MAY 24, 2012**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	13.00	700	20.30
350	13.20	750	20.80
400	14.50	800	21.00
450	15.40	850	23.70
500	15.80	900	21.70
550	16.60	950	24.20
600	18.90	1000	24.30
650	19.10		

COM POWER AH-118**HORN ANTENNA**

S/N: 071175

CALIBRATION DATE: FEBRUARY 29, 2012

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.6	10.0	37.7
1.5	22.0	10.5	38.4
2.0	28.7	11.0	38.0
2.5	29.3	11.5	38.2
3.0	30.6	12.0	39.0
3.5	30.4	12.5	42.4
4.0	31.1	13.0	40.8
4.5	33.4	13.5	40.0
5.0	35.3	14.0	39.7
5.5	35.1	14.5	43.5
6.0	36.9	15.0	42.7
6.5	37.4	15.5	39.7
7.0	37.6	16.0	39.2
7.5	36.2	16.5	39.7
8.0	38.4	17.0	42.2
8.5	39.3	17.5	47.6
9.0	37.4	18.0	51.2
9.5	38.0		

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		



FRONT VIEW

BINSFELD ENGINEERING, INC
LOW PROFILE TRANSMITTER
MODEL: TX10K-LP
FCC SUBPART B AND C – RADIATED EMISSIONS

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

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



REAR VIEW

BINSFELD ENGINEERING, INC
LOW PROFILE TRANSMITTER
MODEL: TX10K-LP
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

Binsfeld Engineering
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Low Channel - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
902.58	70.53	V	114	-43.47	Peak	1	0	
902.58	70.44	V	94	-23.56	QP	1	0	
1805.16	51.71	V	74	-22.29	Peak	1	0	
1805.16	48.74	V	54	-5.26	Avg	1	0	
2707.74	49.48	V	74	-24.52	Peak	1	0	
2707.74	41.44	V	54	-12.56	Avg	1	0	
3610.32	46.43	V	74	-27.57	Peak	1	0	
3610.32	35.14	V	54	-18.86	Avg	1	0	
4512.9	50.13	V	74	-23.87	Peak	1	0	
4512.9	38.81	V	54	-15.19	Avg	1	0	
5415.48								No Emission
5415.48								Detected
6318.06								No Emission
6318.06								Detected
7220.64								No Emission
7220.64								Detected
8123.2								No Emission
8123.2								Detected
9025.8								No Emission
9025.8								Detected

FCC 15.249

Binsfeld Engineering
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Low Channel - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
902.58	83.6	H	114	-30.4	Peak	1.25	155	
902.58	83.51	H	94	-10.49	QP	1.25	155	
1805.16	50.69	H	74	-23.31	Peak	1.35	145	
1805.16	46.76	H	54	-7.24	Avg	1.35	145	
2707.74	48.91	H	74	-25.09	Peak	1.25	155	
2707.74	38.93	H	54	-15.07	Avg	1.25	155	
3610.32	47.39	H	74	-26.61	Peak	1.35	145	
3610.32	35.34	H	54	-18.66	Avg	1.35	145	
4512.9	51.86	H	74	-22.14	Peak	1.25	115	
4512.9	38.84	H	54	-15.16	Avg	1.25	115	
5415.48								No Emission
5415.48								Detected
6318.06								No Emission
6318.06								Detected
7220.64								No Emission
7220.64								Detected
8123.2								No Emission
8123.2								Detected
9025.8								No Emission
9025.8								Detected

FCC 15.249

Binsfeld Engineering
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Low Channel - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
902.58	88.1	V	114	-25.9	Peak	1	90	
902.58	88.01	V	94	-5.99	QP	1	90	
1805.16	51.07	V	74	-22.93	Peak	1.25	155	
1805.16	47.12	V	54	-6.88	Avg	1.25	155	
2707.74	50.19	V	74	-23.81	Peak	1.35	165	
2707.74	40.32	V	54	-13.68	Avg	1.35	165	
3610.32	50.43	V	74	-23.57	Peak	1.25	145	
3610.32	36.16	V	54	-17.84	Avg	1.25	145	
4512.9	53.01	V	74	-0.99	Peak	1.35	155	
4512.9	39.03	V	54	-14.97	Avg	1.35	155	
5415.48								No Emission
5415.48								Detected
6318.06								No Emission
6318.06								Detected
7220.64								No Emission
7220.64								Detected
8123.2								No Emission
8123.2								Detected
9025.8								No Emission
9025.8								Detected

FCC 15.249

Binsfeld Engineering
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Low Channel - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
902.58	87.2	H	114	-26.8	Peak	1.1	150	
902.58	87.11	H	94	-6.89	QP	1.1	150	
1805.16	49.99	H	74	-24.01	Peak	1.25	155	
1805.16	45.82	H	54	-8.18	Avg	1.25	155	
2707.74	49.86	H	74	-24.14	Peak	1.35	145	
2707.74	40.31	H	54	-13.69	Avg	1.35	145	
3610.32	46.31	H	74	-27.69	Peak	1.25	115	
3610.32	35.32	H	54	-18.68	Avg	1.25	115	
4512.9	50.44	H	74	-23.56	Peak	1.35	165	
4512.9	40.35	H	54	-13.65	Avg	1.35	165	
5415.48								No Emission
5415.48								Detected
6318.06								No Emission
6318.06								Detected
7220.64								No Emission
7220.64								Detected
8123.2								No Emission
8123.2								Detected
9025.8								No Emission
9025.8								Detected

FCC 15.249

Binsfeld Engineering
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Low Channel - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
902.58	77.5	V	114	-36.5	Peak	1	90	
902.58	77.41	V	94	-16.59	QP	1	90	
1805.16	52.01	V	74	-21.99	Peak	1.25	165	
1805.16	49.02	V	54	-4.98	Avg	1.25	165	
2707.74	50.31	V	74	-23.69	Peak	1.45	175	
2707.74	43.55	V	54	-10.45	Avg	1.45	175	
3610.32	48.13	V	74	-25.87	Peak	1.25	195	
3610.32	35.34	V	54	-18.66	Avg	1.25	195	
4512.9	51.13	V	74	-22.87	Peak	1.35	155	
4512.9	38.84	V	54	-15.16	Avg	1.35	155	
5415.48								No Emission
5415.48								Detected
6318.06								No Emission
6318.06								Detected
7220.64								No Emission
7220.64								Detected
8123.2								No Emission
8123.2								Detected
9025.8								No Emission
9025.8								Detected

FCC 15.249

Binsfeld Engineering
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Low Channel - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
902.58	81.3	H	114	-32.7	Peak	1	180	
902.58	81.21	H	94	-12.79	QP	1	180	
1805.16	53.45	H	74	-20.55	Peak	1.25	155	
1805.16	50.83	H	54	-3.17	Avg	1.25	155	
2707.74	53.41	H	74	-20.59	Peak	1.25	155	
2707.74	48.55	H	54	-5.45	Avg	1.25	155	
3610.32	47.82	H	74	-26.18	Peak	1.15	165	
3610.32	35.31	H	54	-18.69	Avg	1.15	165	
4512.9	51.23	H	74	-22.77	Peak	1.25	185	
4512.9	38.91	H	54	-15.09	Avg	1.25	185	
5415.48								No Emission
5415.48								Detected
6318.06								No Emission
6318.06								Detected
7220.64								No Emission
7220.64								Detected
8123.2								No Emission
8123.2								Detected
9025.8								No Emission
9025.8								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Middle Channel - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
914.58	74.85	V	114	-39.15	Peak	1	90	
914.58	74.76	V	94	-19.24	QP	1	90	
1829.17	52.36	V	74	-21.64	Peak	1.25	155	
1829.17	49.13	V	54	-4.87	Avg	1.25	155	
2743.8	52.01	V	74	-21.99	Peak	1.35	145	
2743.8	46.04	V	54	-7.96	Avg	1.35	145	
3658.3	48.65	V	74	-25.35	Peak	1.25	145	
3658.3	35.23	V	54	-18.77	Avg	1.25	145	
4572.9	53.42	V	74	-20.58	Peak	1.15	135	
4572.9	40.86	V	54	-13.14	Avg	1.15	135	
5487.5								No Emission
5487.5								Detected
6402.1								No Emission
6402.1								Detected
7316.6								No Emission
7316.6								Detected
8231.2								No Emission
8231.2								Detected
9145.8								No Emission
9145.8								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Middle Channel - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
914.58	85.91	H	114	-28.09	Peak	1.25	135	
914.58	85.82	H	94	-8.18	QP	1.25	135	
1829.17	48.95	H	74	-25.05	Peak	1.35	125	
1829.17	43.42	H	54	-10.58	Avg	1.35	125	
2743.8	50.16	H	74	-23.84	Peak	1.25	145	
2743.8	36.75	H	54	-17.25	Avg	1.25	145	
3658.3	46.62	H	74	-27.38	Peak	1.15	145	
3658.3	35.23	H	54	-18.77	Avg	1.15	145	
4572.9	51.09	H	74	-22.91	Peak	1.25	165	
4572.9	39.51	H	54	-14.49	Avg	1.25	165	
5487.5								No Emission
5487.5								Detected
6402.1								No Emission
6402.1								Detected
7316.6								No Emission
7316.6								Detected
8231.2								No Emission
8231.2								Detected
9145.8								No Emission
9145.8								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012

Labs: B and D

Tested By: Kyle Fujimoto

Middle Channel - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
914.58	90.6	V	114	-23.4	Peak	1	180	
914.58	90.51	V	94	-3.49	QP	1	180	
1829.17	52.43	V	74	-21.57	Peak	1.25	155	
1829.17	49.27	V	54	-4.73	Avg	1.25	155	
2743.8	51.71	V	74	-22.29	Peak	1.55	145	
2743.8	46.47	V	54	-7.53	Avg	1.55	145	
3658.3	48.51	V	74	-25.49	Peak	1.25	165	
3658.3	35.15	V	54	-18.85	Avg	1.25	165	
4572.9	51.89	V	74	-22.11	Peak	1.65	175	
4572.9	39.75	V	54	-14.25	Avg	1.65	175	
5487.5								No Emission
5487.5								Detected
6402.1								No Emission
6402.1								Detected
7316.6								No Emission
7316.6								Detected
8231.2								No Emission
8231.2								Detected
9145.8								No Emission
9145.8								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Middle Channel - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
914.58	84.7	H	114	-29.3	Peak	1.25	135	
914.58	84.61	H	94	-9.39	QP	1.25	135	
1829.17	53.63	H	74	-20.37	Peak	1.15	145	
1829.17	50.49	H	54	-3.51	Avg	1.15	145	
2743.8	48.99	H	74	-25.01	Peak	1.25	165	
2743.8	40.71	H	54	-13.29	Avg	1.25	165	
3658.3	48.02	H	74	-25.98	Peak	1.15	175	
3658.3	35.45	H	54	-18.55	Avg	1.15	175	
4572.9	51.83	H	74	-22.17	Peak	1.25	195	
4572.9	40.71	H	54	-13.29	Avg	1.25	195	
5487.5								No Emission
5487.5								Detected
6402.1								No Emission
6402.1								Detected
7316.6								No Emission
7316.6								Detected
8231.2								No Emission
8231.2								Detected
9145.8								No Emission
9145.8								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Middle Channel - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
914.58	83.5	V	114	-30.5	Peak	1	0	
914.58	83.41	V	94	-10.59	QP	1	0	
1829.17	51.42	V	74	-22.58	Peak	1.25	155	
1829.17	48.12	V	54	-5.88	Avg	1.25	155	
2743.8	52.27	V	74	-21.73	Peak	1.55	180	
2743.8	47.07	V	54	-6.93	Avg	1.55	180	
3658.3	47.53	V	74	-26.47	Peak	1.65	175	
3658.3	35.71	V	54	-18.29	Avg	1.65	175	
4572.9	53.73	V	74	-20.27	Peak	1.25	195	
4572.9	39.83	V	54	-14.17	Avg	1.25	195	
5487.5								No Emission
5487.5								Detected
6402.1								No Emission
6402.1								Detected
7316.6								No Emission
7316.6								Detected
8231.2								No Emission
8231.2								Detected
9145.8								No Emission
9145.8								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

Middle Channel - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Heigh t (m)	Table Angle (deg)	Comments
914.58	80.5	H	114	-33.5	Peak	1	135	
914.58	80.41	H	94	-13.59	QP	1	135	
1829.17	49.63	H	74	-24.37	Peak	1.25	155	
1829.17	44.74	H	54	-9.26	Avg	1.25	155	
2743.8	50.41	H	74	-23.59	Peak	1.35	145	
2743.8	41.14	H	54	-12.86	Avg	1.35	145	
3658.3	48.04	H	74	-25.96	Peak	1.25	165	
3658.3	35.14	H	54	-18.86	Avg	1.25	165	
4572.9	53.35	H	74	-20.65	Peak	1.35	155	
4572.9	40.78	H	54	-13.22	Avg	1.35	155	
5487.5								No Emission
5487.5								Detected
6402.1								No Emission
6402.1								Detected
7316.6								No Emission
7316.6								Detected
8231.2								No Emission
8231.2								Detected
9145.8								No Emission
9145.8								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

High Channel - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
925.09	78.9	V	114	-35.1	Peak	1.25	155	
925.09	78.81	V	94	-15.19	QP	1.25	155	
1850.2	50.95	V	74	-23.05	Peak	1.25	165	
1850.2	48.58	V	54	-5.42	Avg	1.25	165	
2775.3	49.33	V	74	-24.67	Peak	1.35	175	
2775.3	40.71	V	54	-13.29	Avg	1.35	175	
3700.3	48.02	V	74	-25.98	Peak	1.25	185	
3700.3	34.61	V	54	-19.39	Avg	1.25	185	
4625.4	52.72	V	74	-21.28	Peak	1.35	165	
4625.4	39.51	V	54	-14.49	Avg	1.35	165	
5550.5								No Emission
5550.5								Detected
6475.6								No Emission
6475.6								Detected
7400.7								No Emission
7400.7								Detected
8325.8								No Emission
8325.8								Detected
9250.9								No Emission
9250.9								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

High Channel - X-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
925.09	79	H	114	-35	Peak	1	90	
925.09	78.91	H	94	-15.09	QP	1	90	
1850.2	50.37	H	74	-23.63	Peak	1.25	155	
1850.2	48.13	H	54	-5.87	Avg	1.25	155	
2775.3	49.79	H	74	-24.21	Peak	1.35	165	
2775.3	46.42	H	54	-7.58	Avg	1.35	165	
3700.3	43.42	H	74	-30.58	Peak	1.25	165	
3700.3	33.63	H	54	-20.37	Avg	1.25	165	
4625.4	47.67	H	74	-26.33	Peak	1.35	155	
4625.4	38.23	H	54	-15.77	Avg	1.35	155	
5550.5								No Emission
5550.5								Detected
6475.6								No Emission
6475.6								Detected
7400.7								No Emission
7400.7								Detected
8325.8								No Emission
8325.8								Detected
9250.9								No Emission
9250.9								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

High Channel - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
925.09	79.1	V	114	-34.9	Peak	1.25	155	
925.09	79.01	V	94	-14.99	QP	1.25	155	
1850.2	51.52	V	74	-22.48	Peak	1.25	155	
1850.2	43.81	V	54	-10.19	Avg	1.25	155	
2775.3	53.74	V	74	-20.26	Peak	1.25	155	
2775.3	49.41	V	54	-4.59	Avg	1.25	155	
3700.3	47.21	V	74	-26.79	Peak	1.25	155	
3700.3	34.76	V	54	-19.24	Avg	1.25	155	
4625.4	50.99	V	74	-23.01	Peak	1.25	155	
4625.4	39.64	V	54	-14.36	Avg	1.25	155	
5550.5								No Emission
5550.5								Detected
6475.6								No Emission
6475.6								Detected
7400.7								No Emission
7400.7								Detected
8325.8								No Emission
8325.8								Detected
9250.9								No Emission
9250.9								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012
Labs: B and D
Tested By: Kyle Fujimoto

High Channel - Y-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
925.09	75.7	H	114	-38.3	Peak	1	180	
925.09	75.61	H	94	-18.39	QP	1	180	
1850.2	49.71	H	74	-24.29	Peak	1.25	135	
1850.2	47.13	H	54	-6.87	Avg	1.25	135	
2775.3	50.93	H	74	-23.07	Peak	1.25	125	
2775.3	46.91	H	54	-7.09	Avg	1.25	125	
3700.3	48.05	H	74	-25.95	Peak	1.15	165	
3700.3	35.84	H	54	-18.16	Avg	1.15	165	
4625.4	52.26	H	74	-21.74	Peak	1.25	155	
4625.4	39.68	H	54	-14.32	Avg	1.25	155	
5550.5								No Emission
5550.5								Detected
6475.6								No Emission
6475.6								Detected
7400.7								No Emission
7400.7								Detected
8325.8								No Emission
8325.8								Detected
9250.9								No Emission
9250.9								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012

Labs: B and D

Tested By: Kyle Fujimoto

High Channel - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
925.09	78.8	V	114	-35.2	Peak	1	90	
925.09	78.71	V	94	-15.29	QP	1	90	
1850.2	51.84	V	74	-22.16	Peak	1.25	155	
1850.2	48.15	V	54	-5.85	Avg	1.25	155	
2775.3	50.74	V	74	-23.26	Peak	1.25	165	
2775.3	47.01	V	54	-6.99	Avg	1.25	165	
3700.3	46.69	V	74	-27.31	Peak	1.15	175	
3700.3	34.94	V	54	-19.06	Avg	1.15	175	
4625.4	52.41	V	74	-21.59	Peak	1.25	185	
4625.4	39.58	V	54	-14.42	Avg	1.25	185	
5550.5								No Emission
5550.5								Detected
6475.6								No Emission
6475.6								Detected
7400.7								No Emission
7400.7								Detected
8325.8								No Emission
8325.8								Detected
9250.9								No Emission
9250.9								Detected

FCC 15.249

Binsfeld Engineering, Inc.
Low Profile Transmitter
Model: TX10K-LP

Date: 08/17/2012

Labs: B and D

Tested By: Kyle Fujimoto

High Channel - Z-Axis

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
925.09	85.3	H	114	-28.7	Peak	1	180	
925.09	85.21	H	94	-8.79	QP	1	180	
1850.2	53.06	H	74	-20.94	Peak	1	180	
1850.2	49.45	H	54	-4.55	Avg	1	180	
2775.3	48.94	H	74	-25.06	Peak	1	180	
2775.3	39.91	H	54	-14.09	Avg	1	180	
3700.3	46.79	H	74	-27.21	Peak	1.25	155	
3700.3	34.71	H	54	-19.29	Avg	1.25	155	
4625.4	52.32	H	74	-21.68	Peak	1.25	145	
4625.4	39.57	H	54	-14.43	Avg	1.25	145	
5550.5								No Emission
5550.5								Detected
6475.6								No Emission
6475.6								Detected
7400.7								No Emission
7400.7								Detected
8325.8								No Emission
8325.8								Detected
9250.9								No Emission
9250.9								Detected

Test Location : Compatible Electronics **Page** : 1/1
Customer : Binsfeld Engineering, Inc. **Date** : 8/12/2012
Manufacturer : Binsfeld Engineering, Inc. **Time** : 9:47:33
Eut name : Low Profile Transmitter **Lab** : B and D
Model : TX10K-LP **Test Distance** : 3
Serial # : N/A
Specification : FCC Class B
Distance correction factor (20 * log(test/spec)) : 0.00
Test Mode : Spurious Emissions - 10 kHz to 9300 MHz
Below Readings are Band Edges - No Other Spurious Emissions
Test Engineer: Kyle Fujimoto

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	Limit = L dBuV/m	Delta R-L dB
1V	902.000	35.90	4.30	21.80	37.50	24.50	46.00	-21.50
2V	902.032	36.40	4.30	21.80	37.50	25.01	46.00	-20.99
3H	928.000	35.60	4.30	23.12	37.48	25.53	46.00	-20.47

