

# FCC PART 18

## MEASUREMENT AND TEST REPORT

For

### Firefly Lighting Co., Ltd.

Firefly Building, Jinzhongyuan Industrial Area, Zhongzhai, Xiamen, Fujian, China.

**FCC ID:PGEBH4**

November 18,2003

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> Energy – Saving Lamp
<b>Test Engineer:</b> <u>Jandy Su</u>	
<b>Report Number</b> <u>RSZ03102815</u>	
<b>Test Date:</b> <u>November 18,2003</u>	
<b>Reviewed By:</b> _____	
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**Note:** This test report is specially limited to the use of the above client company and the product model only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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## 1 - GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

The *Firefly Lighting Co., Ltd.* 's model *BH4-14W;BH4-18W;BH4-20W;XEU48-20U;XEU48-14U;XEU48-11U* or the "EUT" as referred to in this report is a *Energy –Saving Lamp* which measures approximately in the table, rated input voltage: AC 120 V/60Hz.

Table:

EUT	Length (cm)	Wide (cm)	Height (cm)
BH4-14W	11.5	5.0	5.0
BH4-18W	4.6	4.6	12.0
BH4-20W	12	5.5	5.5
XEU48-20U	13	4.5	4.5
XEU48-14U	11	5.0	5.0
XEU48-11U	10	4.5	4.5

*The test data was only good for the test sample. It may have deviation for other test sample.*

### 1.2 Objective

The following test report is prepared on behalf of *Firefly Lighting Co., Ltd.* in accordance with Part 2, Subpart J, and Part 18, Subparts A, B, and C of the Federal Communication Commissions rules and regulations.

The objective of the manufacturer is to demonstrate compliance with FCC Part 18 limit requirements for Industrial, Scientific, and Medical Equipment.

### 1.3 Related Submittal(s)/Grant(s)

No Related Submittals.

### 1.4 Test Methodology

All measurements contained in this report were conducted with MP-5, FCC Methods of Measurements of Radio Noise Emissions from ISM Equipment, February 1986. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 Meters.

### 1.5 Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at the back parking lot of the building at 230 Commercial Street, Sunnyvale, CA 94085 USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on

December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2001 and FCC MP-5.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, IEC/CISPR 22: 1998, and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

## 1.6 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R/S	Spectrum Analyzer	FSEM	849720/019	08/05/2003	1 year
HP	Amplifier	8447D	2944A09795	08/05/2003	1 year
ETS	Log Periodic Antenna	3146	9603-4421	09/05/2003	1 year
ETS	Biconical Antenna	3110B	3360	08/05/2003	1 year
Solar Electronics	LISN	TYPE 8012-50-R-24-BNC	21162	09/05/2003	1 year
Solar Electronics	LISN	TYPE 8012-50-R-25-BNC	21163	10/05/2003	1 year
COM Power	LISN	LI-200	12208	10/30/2003	1 year
COM Power	LISN	LI-200	12005	10/30/2003	1 year
HP	Spectrum Analyzer	8568B	2517A01610	10/30/2003	1 year
HP	Spectrum Analyzer Display Unit	8568B	2517A10039	10/30/2003	1 year
HP	Quasi-Peak Adapter	8565A	3107A01572	10/30/2003	1 year
FCC	Absorbing Clamp	F-201-23mm	90	10/30/2003	1 year
FLUKE	True RMS Multimeter	187	78540402	03/24/2003	1 year

\* **Statement of Traceability: Bay Area Compliance Laboratory Corp.** Certifies that all calibration has been performed using suitable standards traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY.

## 1.7 External I/O Cabling

Cable Description	Length (M)	From/Port	To
AC Mains Cable	1.3	AC Mains	EUT

## **2 - SYSTEM TEST CONFIGURATION**

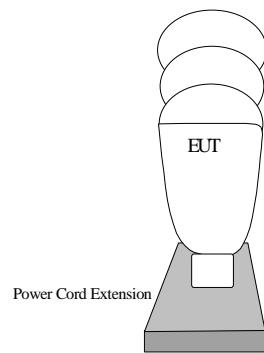
### **2.1 Justification**

The EUT was tested under normal mode as used by a common (typical) user.

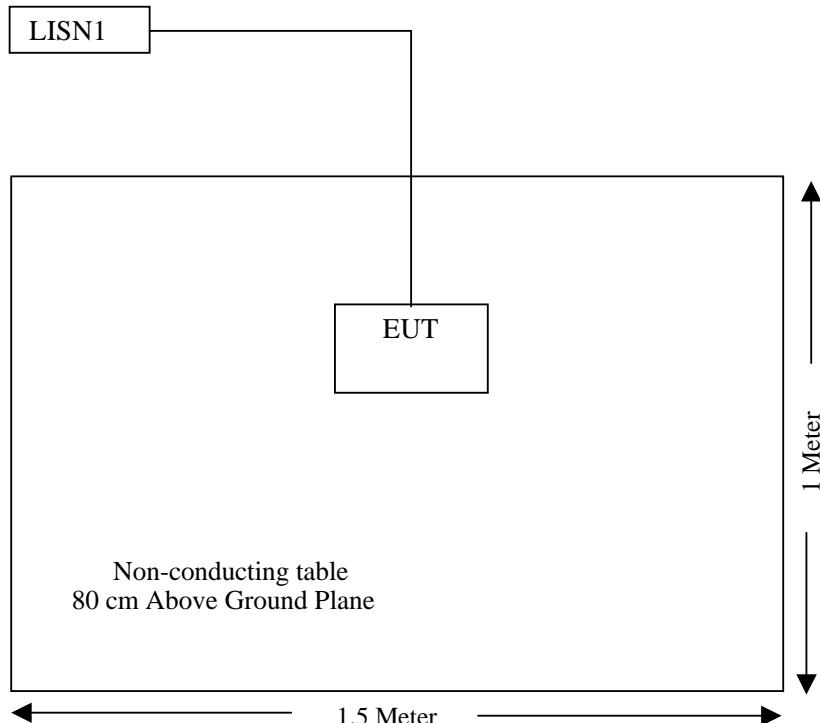
### **2.2 Equipment Modifications**

No modifications were made by BACL to ensure the EUT to comply with the application limits and requirements.

### **2.3 Configuration of Test System**



### **2.4 Test Setup Block Diagram**



## **3 - CONDUCTED EMISSIONS TEST DATA**

### **3.1 Measurement Uncertainty**

All measurements involve certain levels of uncertainties, especially in field of EMI. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is  $\pm 2.4$  dB.

### **3.2 EUT Setup**

The setup of EUT is according with MP-5 measurement procedure. The specification used was the FCC Part 18 limits.

The EUT was connected to the power cord extension and placed on the center of the back edge on the test table.

The power cord extension was connected with 120 VAC/60 Hz power source.

### **3.3 Spectrum Analyzer Setup**

The spectrum analyzer was set with the following configuration during the conduction test:

Start Frequency.....	450 KHz
Stop Frequency .....	30 MHz
Sweep Speed.....	Auto
IF Bandwidth .....	10 KHz
Video Bandwidth .....	10 KHz
Quasi-Peak Adapter Bandwidth.....	9 KHz
Quasi-Peak Adapter Mode.....	Normal

### 3.4 Test Procedure

During the conducted emission test, the power cord of the power cord extension was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions to ensure that the EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dB $\mu$ V of specification limits). Quasi-peak readings are distinguished with a "QP".

The EUT was tested under the normal modes during the final qualification test to represent the worst case results.

### 3.5 Conducted Emissions Test Data

Date of Test :	November 18,2003	Temperature :	25
EUT :	Energy – Saving Lamp	Humidity :	70%
M/N :	BH4-14W	Operating Mode :	On
S/N :	N/A	Test Engineer:	Jandy Su

LINE CONDUCTED EMISSIONS				FCC PART 18	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB $\mu$ V	QP/Ave/Peak	Line/Neutral	dB $\mu$ V	dB
0.51	46.32	QP	Line	48	-1.7
0.69	41.85	QP	Line	48	-6.2
0.45	37.92	QP	Line	48	-10.1
0.57	36.83	QP	Neutral	48	-11.2
1.16	32.22	QP	Neutral	48	-15.8
2.17	30.05	QP	Neutral	48	-18.0

Date of Test :	November 18,2003	Temperature :	25
EUT :	Energy – Saving Lamp	Humidity :	70%
M/N :	BH4-18W	Operating Mode :	On
S/N :	N/A	Test Engineer:	Jandy Su

LINE CONDUCTED EMISSIONS				FCC PART 18	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB $\mu$ V	QP/Ave/Peak	Line/Neutral	dB $\mu$ V	dB
0.45	36.54	QP	Neutral	48.00	-11.46
0.45	35.52	QP	Line	48.00	-12.48
1.04	34.48	QP	Neutral	48.00	-13.52
2.16	30.38	QP	Neutral	48.00	-17.62
14.84	26.7	QP	Line	48.00	-21.30
27.22	23.26	QP	Line	48.00	-24.74

Date of Test : November 18,2003      Temperature : 25  
 EUT : Energy – Saving Lamp      Humidity : 70%  
 M/N : BH4-20W      Operating Mode : On  
 S/N : N/A      Test Engineer: Jandy Su

LINE CONDUCTED EMISSIONS				FCC PART 18	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB $\mu$ V	QP/Ave/Peak	Line/Neutral	dB $\mu$ V	dB
0.81	40.43	QP	Line	48	-7.6
0.45	39.83	QP	Line	48	-8.2
0.57	38.43	QP	Line	48	-9.6
0.45	36.14	QP	Neutral	48	-11.9
0.63	35.41	QP	Neutral	48	-12.6
8.8	33.47	QP	Neutral	48	-14.5

Date of Test : November 18,2003      Temperature : 25  
 EUT : Energy – Saving Lamp      Humidity : 70%  
 M/N : XEU48-20U      Operating Mode : On  
 S/N : N/A      Test Engineer: Jandy Su

LINE CONDUCTED EMISSIONS				FCC PART 18	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB $\mu$ V	QP/Ave/Peak	Line/Neutral	dB $\mu$ V	dB
0.57	38.71	QP	Line	48	-9.3
0.57	36.94	QP	Line	48	-11.1
5.66	35.15	QP	Line	48	-12.9
8.15	35.11	QP	Neutral	48	-12.9
2.23	30.08	QP	Neutral	48	-17.9
2.7	28.47	QP	Neutral	48	-19.5

Date of Test : November 18,2003      Temperature : 25  
 EUT : Energy – Saving Lamp      Humidity : 70%  
 M/N : XEU48-14U      Operating Mode : On  
 S/N : N/A      Test Engineer: Jandy Su

LINE CONDUCTED EMISSIONS				FCC PART 18	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB $\mu$ V	QP/Ave/Peak	Line/Neutral	dB $\mu$ V	dB
0.57	39.28	QP	Line	48	-8.7
0.63	38.23	QP	Line	48	-9.8
7.2	34.64	QP	Line	48	-13.4
3.06	30.31	QP	Neutral	48	-17.7
2.76	28.89	QP	Neutral	48	-19.1
9.63	24.45	QP	Neutral	48	-23.6

Date of Test : November 18,2003      Temperature : 25  
EUT : Energy –Saving Lamp      Humidity : 70%  
M/N : XEU48-11U      Operating Mode : On  
S/N : N/A      Test Engineer: Jandy Su

LINE CONDUCTED EMISSIONS				FCC PART 18	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB $\mu$ V	QP/Ave/Peak	Line/Neutral	dB $\mu$ V	dB
0.45	38.78	QP	Line	48	-9.2
0.45	38.23	QP	Line	48	-9.8
1.52	36.81	QP	Line	48	-11.2
3.35	30.14	QP	Neutral	48	-17.9
4.0	25.49	QP	Neutral	48	-22.5
12.83	23.1	QP	Neutral	48	-24.9

### 3.6 Test Result

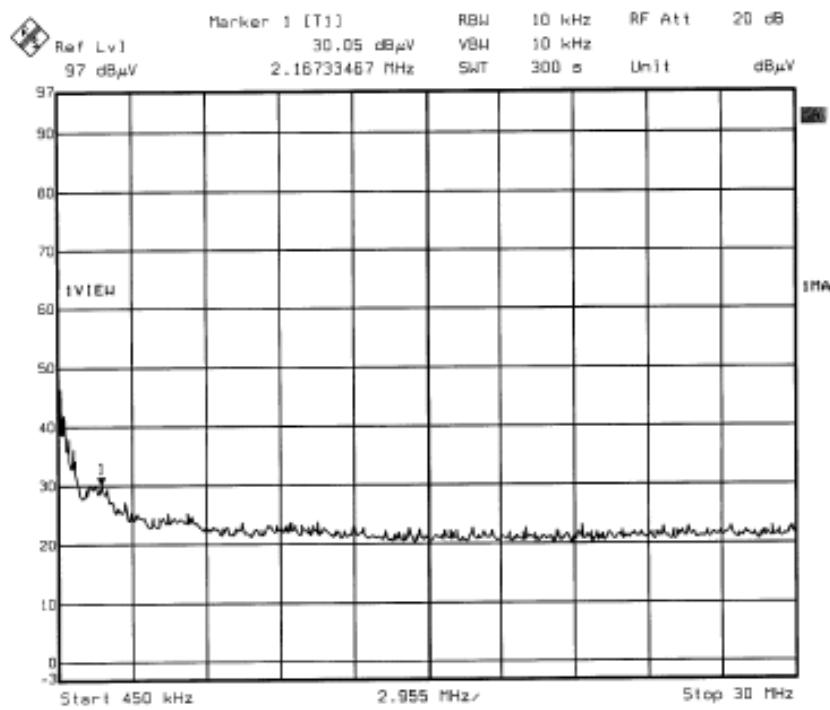
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### 3.7 Plot(s) of Conducted Emissions Test Data

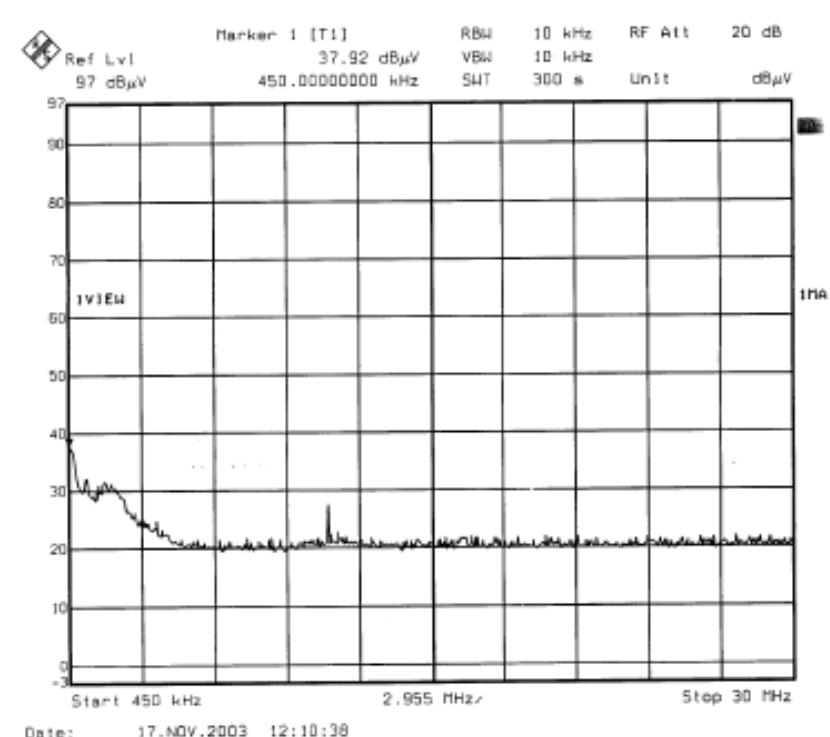
Plot(s) of Conducted Emissions Test Data is presented hereinafter as reference.

**BH4-14W**

Line:

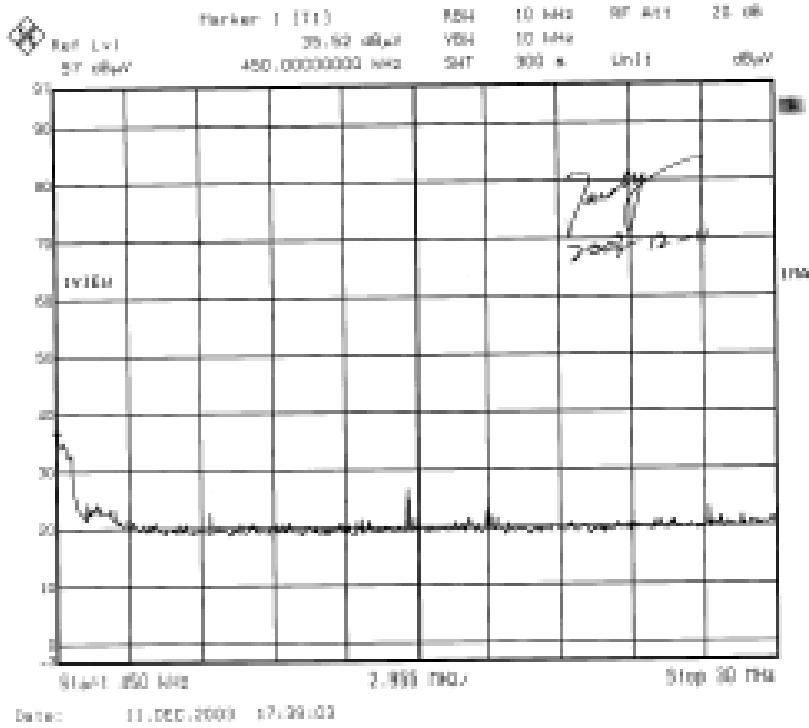


Neutral:

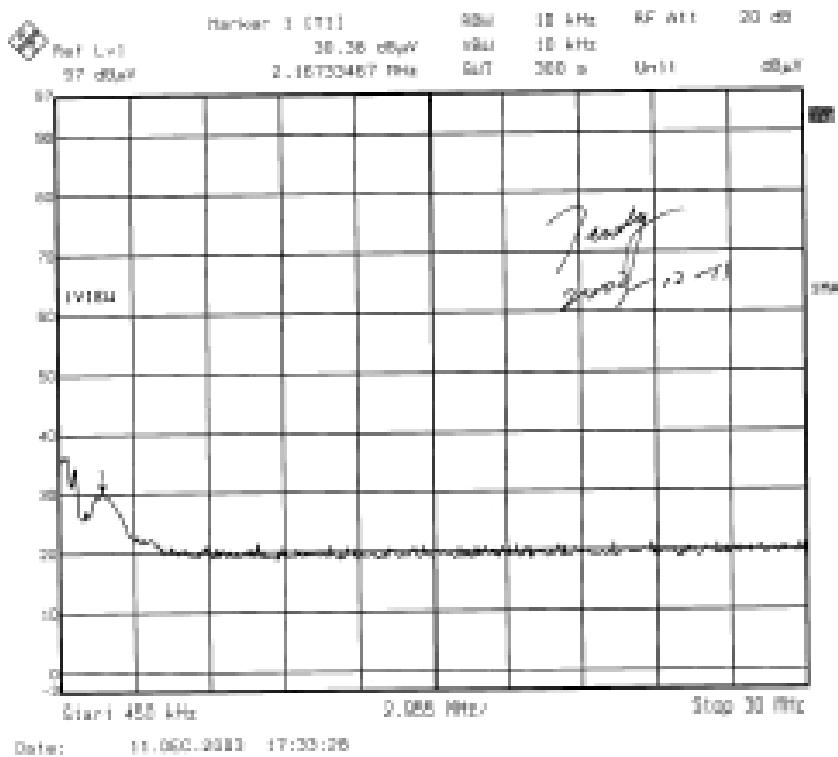


**BH4-18W**

Line:

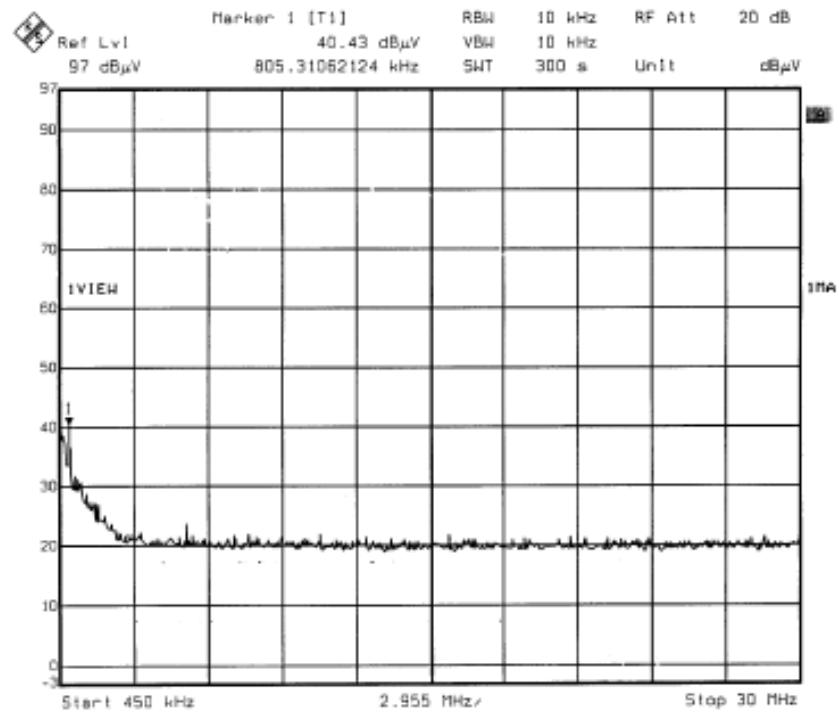


Neutral:

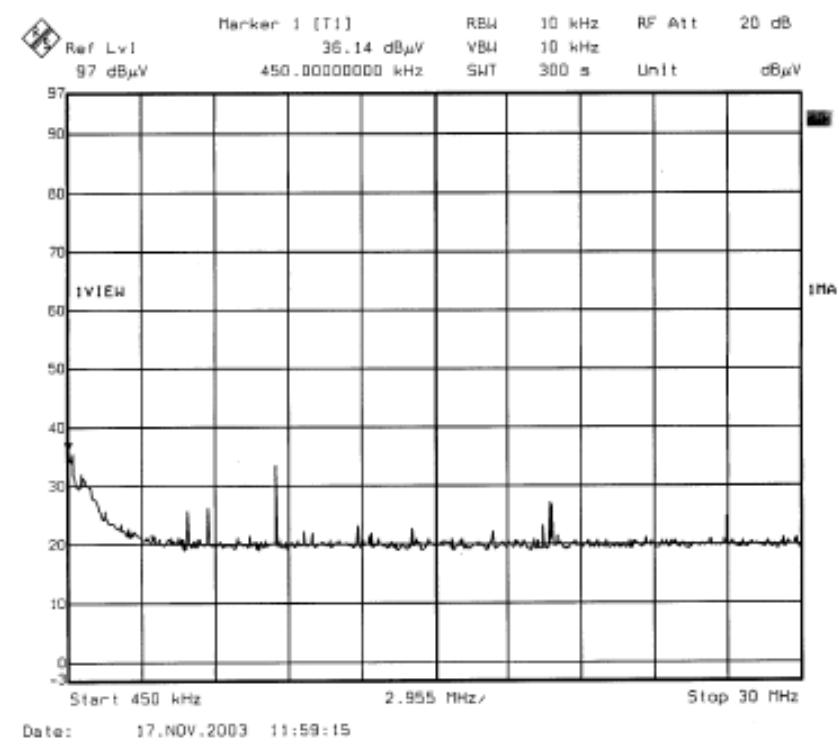


**BH4-20W**

Line:

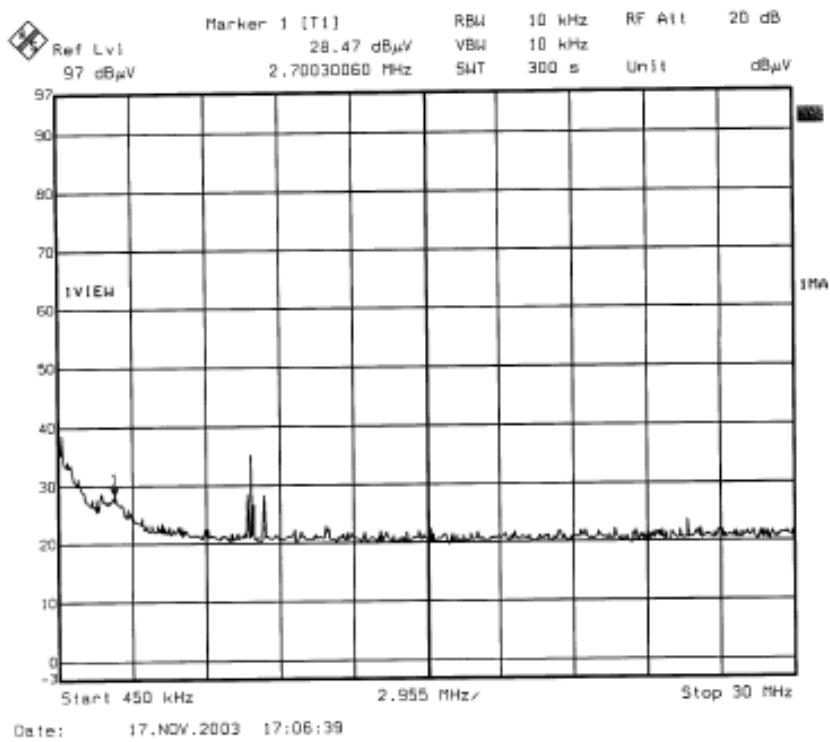


Neutral:

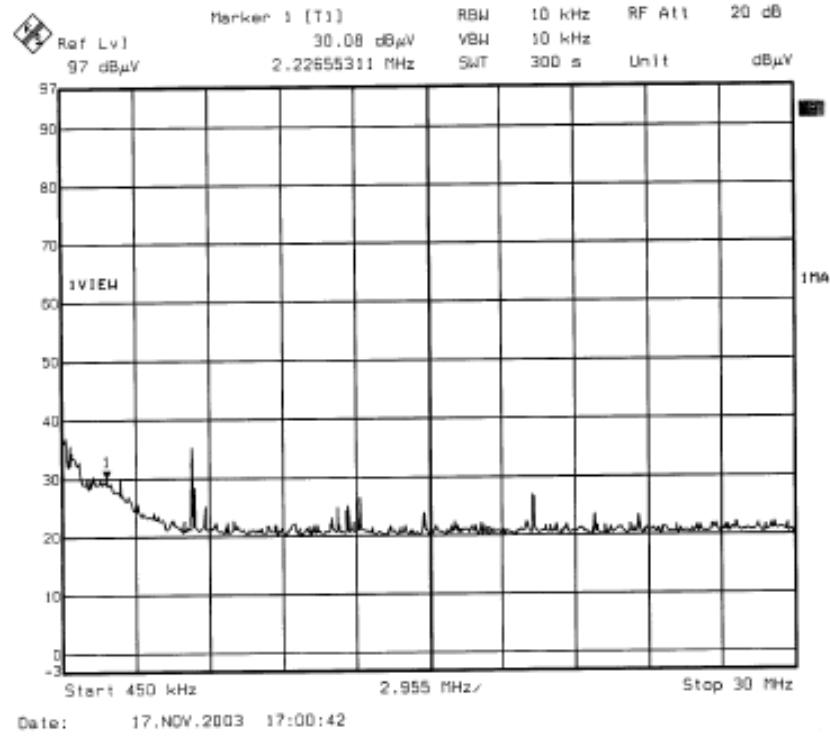


**XEU48-20U**

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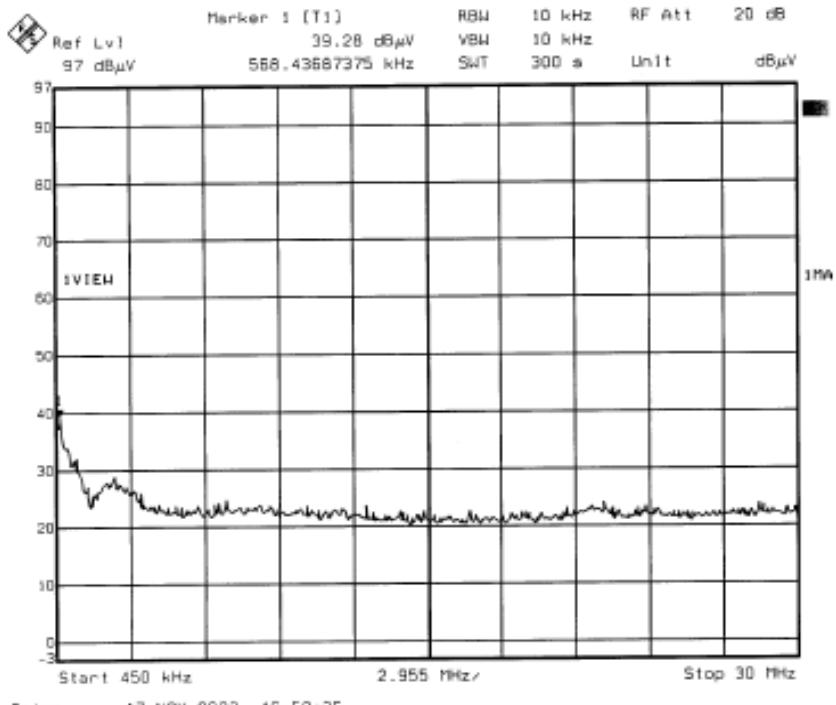


Neutral:

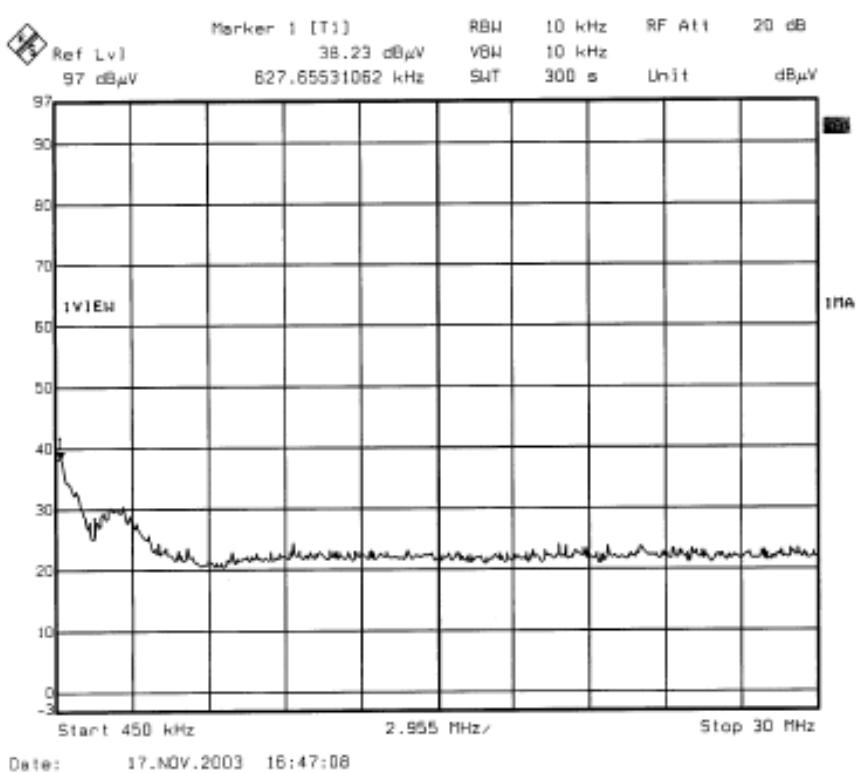


**XEU48-14U**

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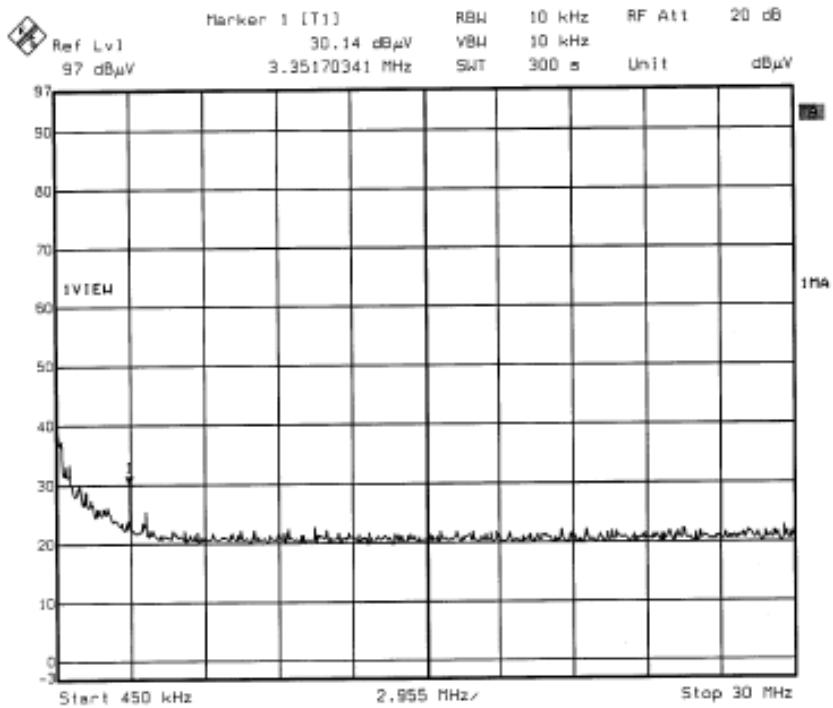


Neutral:



**XEU48-11U**

Line:



Neutral:

