

**PERFORMANCE TEST OF STREET LIGHT  
ENERGY SAVE SWITCH**

**Manufactured by  
KAKATIYA ENERGY SYSTEMS LIMITED**

**REPORT NO.: CPRI/ERED/LC/02/2011**  
*(Work order No.: Nil, DATED 10/09/2011)*



**NOVEMBER 2011**

**Test conducted by**

**CENTRAL POWER RESEARCH INSTITUTE**  
**(A Govt. of India Society)**  
**ENERGY EFFICIENCY AND RENEWABLE ENERGY DIVISION**  
**P. B. No. : 8066, Prof. Sir.C.V. Raman Road**  
**Sadashivanagar Sub. P.O. BANGALORE - 560 080.**



CPRI

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ENERGY EFFICIENCY AND RENEWABLE ENERGY DIVISION  
CENTRAL POWER RESEARCH INSTITUTE,  
P.B. No. 8066, Sadashivanagar Sub P.O.,  
Prof. Sir. C.V. Raman Road, Bangalore – 560 080

## Project Summary

01	Title:	Performance test on Street light Energy Save Switch
02	Manufactured by:	M/s. Kakatiya Energy Systems Limited 3-6-272, N.V.K. Towers, Himayat Nagar, Hyderabad – 500 029
03	Contact Person	P.R.L. Rao, Managing Director
04	Testing agency:	Central Power Research Institute, P.B. No. 8066, Sir C. V. Raman Road, Sadashivanagar Sub-P.O., Bangalore-560080 Tel:080-23604682 FAX: 080-23601213
05	Contact Person (Testing agency):	M. Siddhartha Bhatt, Additional Director (EC & DD) Central Power Research Institute, P.B. No. 8066, Sir C. V. Raman Road, Sadashivanagar Sub-P.O., Bangalore-560080 Tel: 080-23604682 FAX: 080-23604682 E-mail: msb@cpri.in
06	Test Engineer	K. Pradeep , Engineering Assistant
07	Objectives:	Performance test on Lighting Controller
08	Scope of work:	<ul style="list-style-type: none"><li>• Measurement of power supply parameters with Save switch for 12 hours and without save switch for 12 hours</li><li>• Measurement of lighting level at a common point during by-pass mode and auto mode.</li><li>• Computation of energy input.</li></ul>
09	Report No.:	CPR/ERED/LC/02/2011
10	Date of issue of report:	30 <sup>th</sup> November 2011
11	Signature of Head of Division	



**TEST ENGINEER**

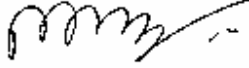


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Prof. Sir. C.V. Raman Road, Bangalore – 560 080

PERFORMANCE REPORT OF SAVE SWITCH FOR STREET LIGHT

SL No.	PARTICULARS	DETAILS
01	Title	Performance test on Street Light Energy Save Switch
02	Name and address of the client	M/s. Kakatiya Energy Systems Limited
03	Name of the person witnessing the test	P.R.L. Rao, Managing Director
04	Date and time of test	i). with save switch: 07/10/2011 – 15.00 Hrs to 08/10/2011 – 03.00 hrs ii). Without save switch: 08/10/2011 -11:00 Hrs to 08/10/2011 -23.00 Hrs
05	Street light controller details	i). Make: Kakatiya Energy Systems Limited ii). Rating :250 W AC 1 Phase,2 wire system iii). Sl. No. 11379
06	Particulars of study & test conducted	i). Power measurement without save switch ii). Power measurement with save switch. iii). Measurement of illumination at a common point iv). Computation of energy saving
07	Load connected to the controller	1 Number of sodium vapor lamp – 250W
08	Meters used	Power analyzer: Automatic recording type 3 phase, 4 wire power analyzer of Krykard make (Sl. No.296945) Current clamps and Voltage probes. Calibration validity up to 24-12-2011 Lux meter: Make – Yokogawa (Sl. No. 090093 ) Calibration Validity up to 03/11/2011
09	Total number of pages	30
10	Signature of the Divisional Head	 M. Siddhartha Bhatt (Additional Director, ERED)



  
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ENERGY EFFICIENCY AND RENEWABLE ENERGY DIVISION  
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Prof. Sr. C.V. Raman Road, Bangalore – 560 080

**PERFORMANCE TEST OF SAVE SWITCH FOR STREET LIGHT**

Sl.No.	Particulars	Description
01	Supplier	M/s. Kakatiya Energy Systems Limited
02	Name of the Energy Saver	Save switch
05	capacity	250 W
05	Equipment Sl. No.	11379

**DETAILS OF THE TEST**

Sl.No.	Tests	Results
01	Energy and Power Test	Change in electrical energy input without save switch and with save switch Reduction by: 38.25 % Details are shown in Annexure-1
03	Illumination Test	Lux level measured at height of 2 meter at a common point Without save switch – 466 lux With save switch – 406 lux The reduction in lux level is – 12.86 %
04	Power Factor Test	The Average power factor is increased by using the save switch Power factor without save switch – 0.82 Power factor with save switch – 0.87
05	THD- Total Harmonic Distortion Test	The current THD without Energy save switch is 289.94 % (max.) and the voltage THD is 2.10 % (max.). The current THD with Energy save switch is 253.04 % (max.) and the voltage THD is 2.90 % (max.). The Current harmonics is decreasing due to energy saver. The details are given in Annexure – 2

- This is not a certificate of compliance.
- These test results relate only to the items tested, which are selected and submitted by the client mentioned above.
- The data reported in this test report are valid at the time of testing and under the stipulated conditions of measurements.
- Publications or reproduction of this report in any form other than by complete set of the whole report and in the language written is not permitted without consent of CPRI.
- Correction/erasing invalidate the test report.



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Prof. Sir. C.V. Raman Road, Bangalore - 560 080

**PERFORMANCE TEST OF SAVE SWITCH FOR STREET LIGHT**

Sl. No.	Particulars	Manufacturer specification	Observation by CPRI
01	Visual Examination	Device shall be examined for the finish	Complies
02	Operating voltage range test	150 V to 290 V AC	Complies
03	Device Power consumption in HW test	1.5 W MAX	1.263 W
04	Device power consumption in LW test	1.5 percent of NWR of the load +3.5 W (NWR - Nominal Wattage range)	4.896 W for a 250 W lamp
05	Insulation resistance (Dry test)	Not less than 5Mohms	312 MΩ
06	Wattage transition test	Smooth transition from HW to LW and flicker free operation after dimming	Complies
07	Pre-dimming duration test	Same as the accuracy of line frequency (tested for all switch positions)	Complies
08	Pre-warming duration test	5min ± 5 sec	Complies



  
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**ANNEXURE – 1**  
**ENERGY & POWER TEST**

Test Description: The test is conducted to have a comparative study of energy consumption of the load with and without the above mentioned energy saver and thus evaluate the percentage of saving obtained with Street light controller (Make: GEMS) connected.

**COMPARATIVE STATEMENT OF ENERGY CONSUMPTION**  
**NOMAL VS ENERGY SAVER**

Sl. No.	Particulars	Without Energy Saver	With Energy Saver
1	Starting date	08/10/2011	07/10/2011
2	Finishing date	08/10/2011	08/10/2011
5	Starting time	11.00 Hrs	15.00 Hrs
7	Finishing time	23.00 Hrs	03.00 Hrs
8	Energy consumption (kWh)	3.174	1.963
9	Load on duration	12.00 hrs	12.00 hrs
10	Average consumption per hour (kWh)	0.264	0.163
11	Change in energy consumption in auto-mode	–	38.25 % (reduction)

Sl. No.	Particulars	Details
01	Table -1	Measured electrical parameters with save switch
02	Table-2	Measured electrical parameters without save switch
03	Figure 1 & 2	Input voltage variation without and with save switch
04	Figure 3 & 4	Input Current variation without and with save switch
05	Figure 5 & 6	Power factor variation with out and with save switch
05	Figure 7 & 8	Power variation with out and with save switch



*(Signature)*

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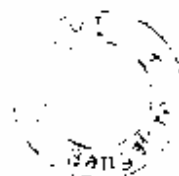
ANNEXURE - 2  
THD-TOTAL HARMONICS DISTORTION TEST

Date and time of : i). with save switch: 07/10/2011 - 15.00 Hrs to  
08/10/2011 - 03.00 hrs  
ii). Without save switch: 08/10/2011 -11:00 Hrs to  
08/10/2011 -23.00 Hrs

Test Description : This test is conducted to asses if the introduction of the  
Save switch causes an increase/decrease in the Total  
Harmonic Distortion

Sl. No.	Description	Without Energy Saver (MAX)	With Energy Saver (MAX)	Remarks
01	THD Current	289.94 %	253.04 %	
02	THD Voltage	2.10 %	2.90 %	

Sl. No.	Particulars	Details
01	Figure 9 and 10	Voltage harmonics without and with save switch
02	Figure 11 and 12	Current harmonics without and with save switch



  
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Figure 1: input Voltage variation without save switch to the lamp

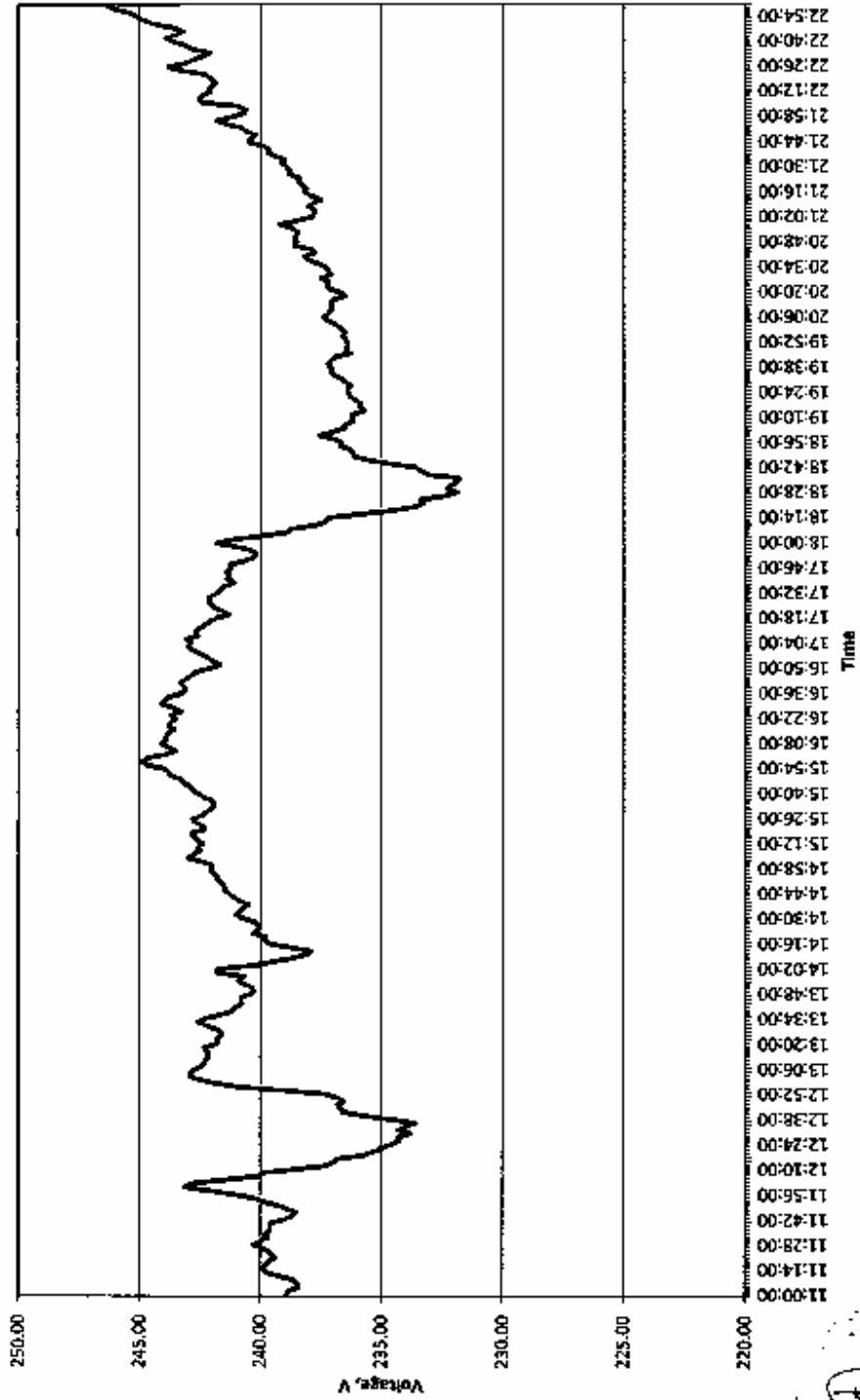


Figure 2: Input voltage variation with save switch to the lamp

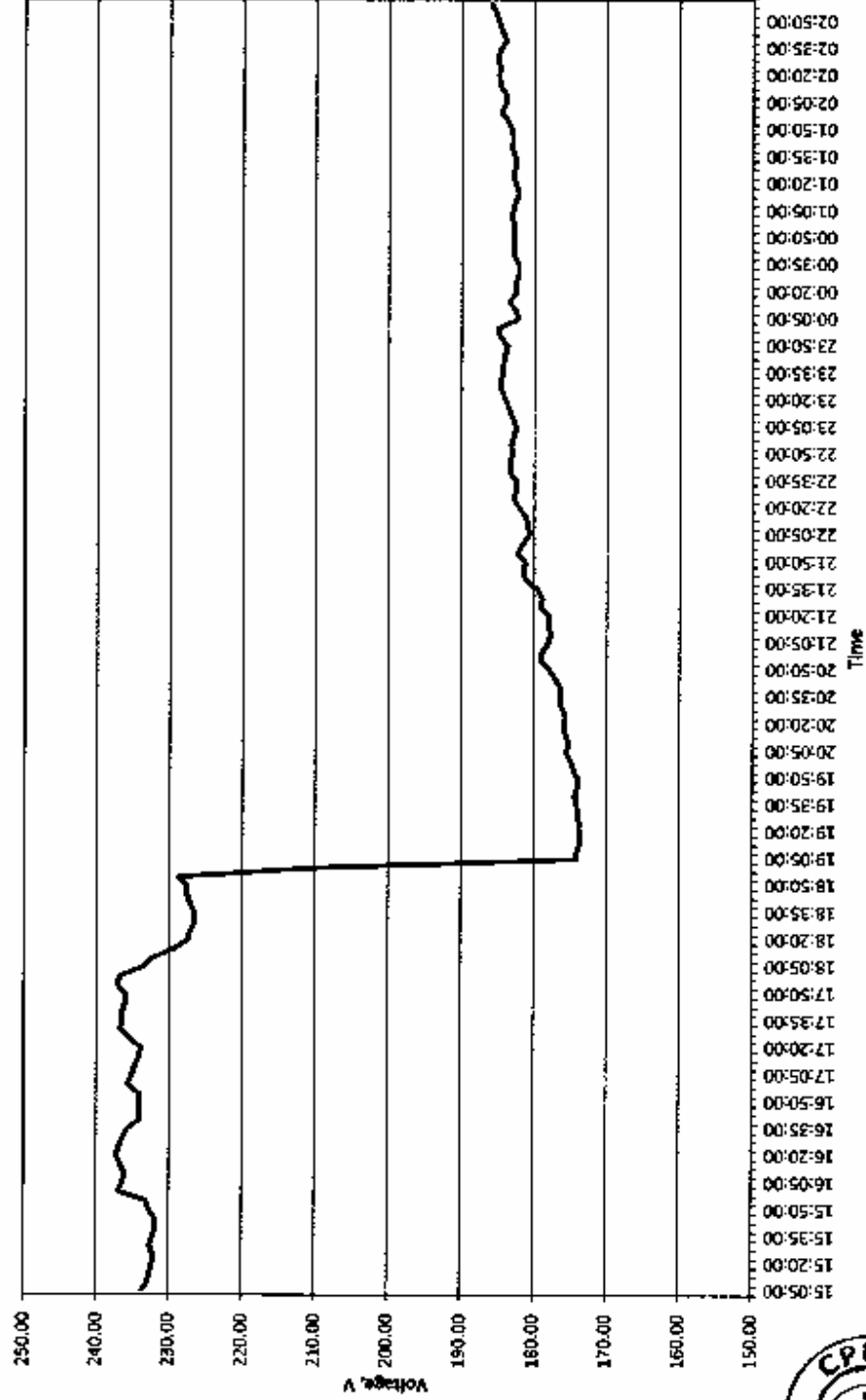


Figure 3: input current variation to the lamp without save switch

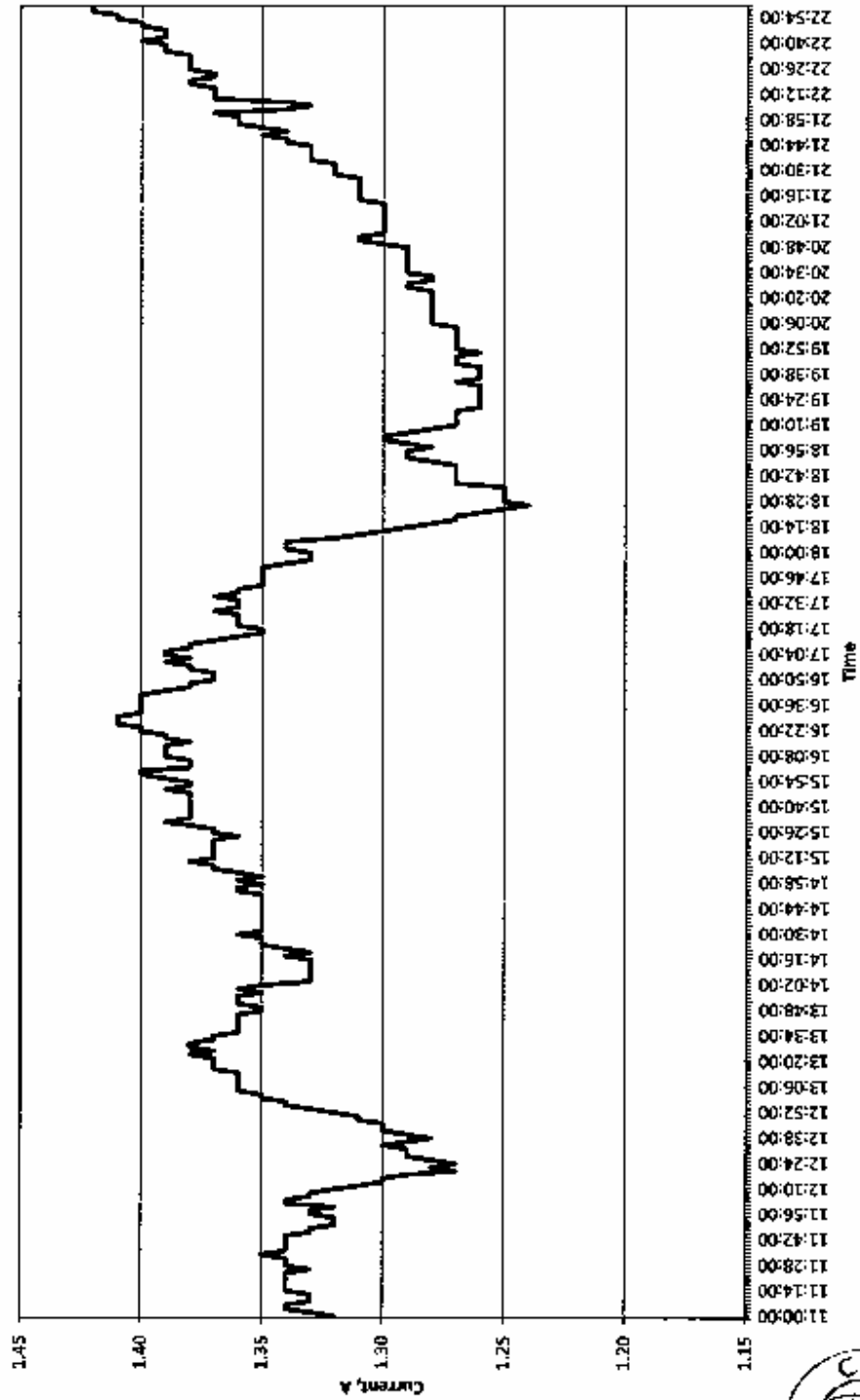


Figure 4: Input current variation to the lamp with save switch

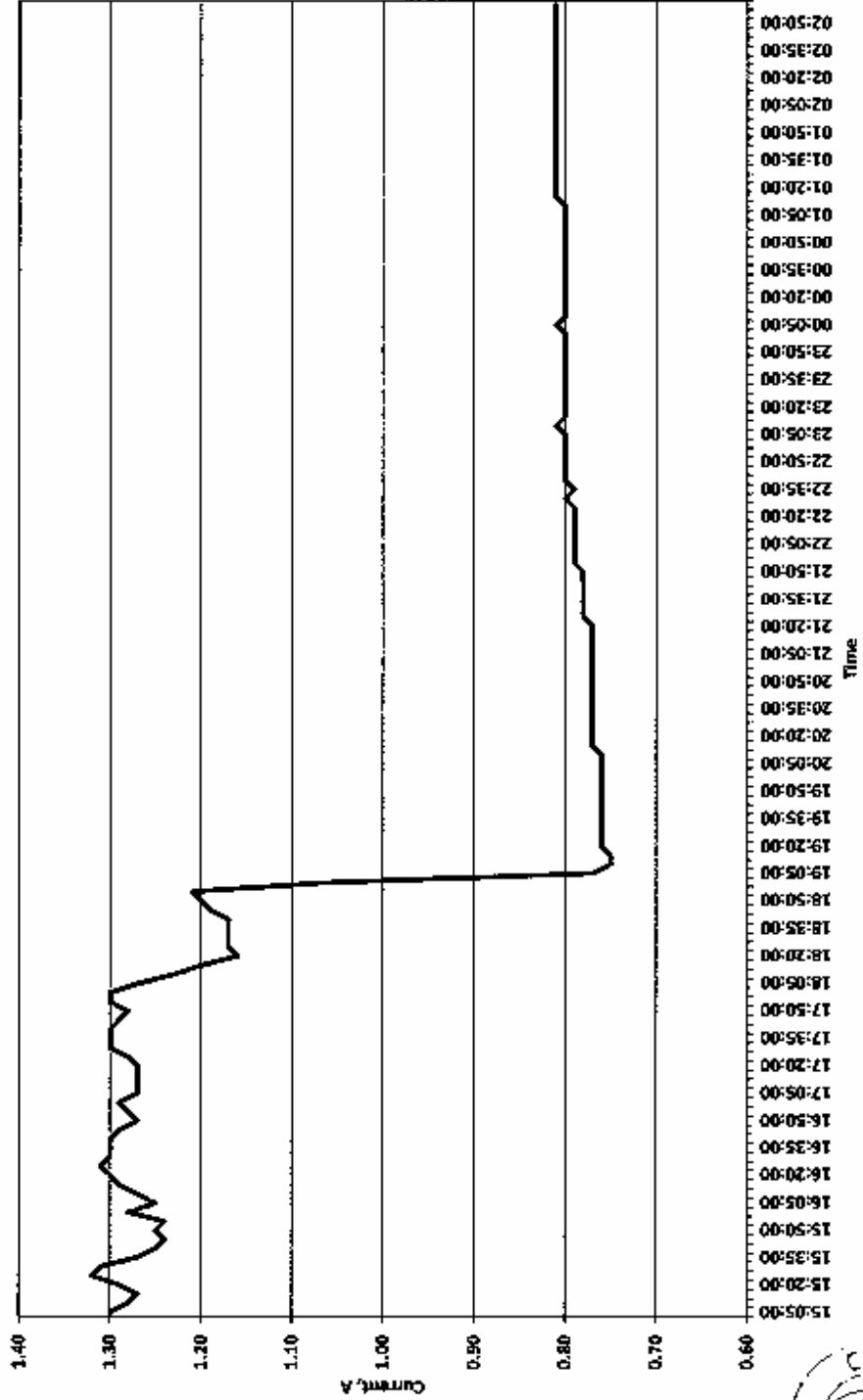


Figure 5: Input powerfactor variation without save switch

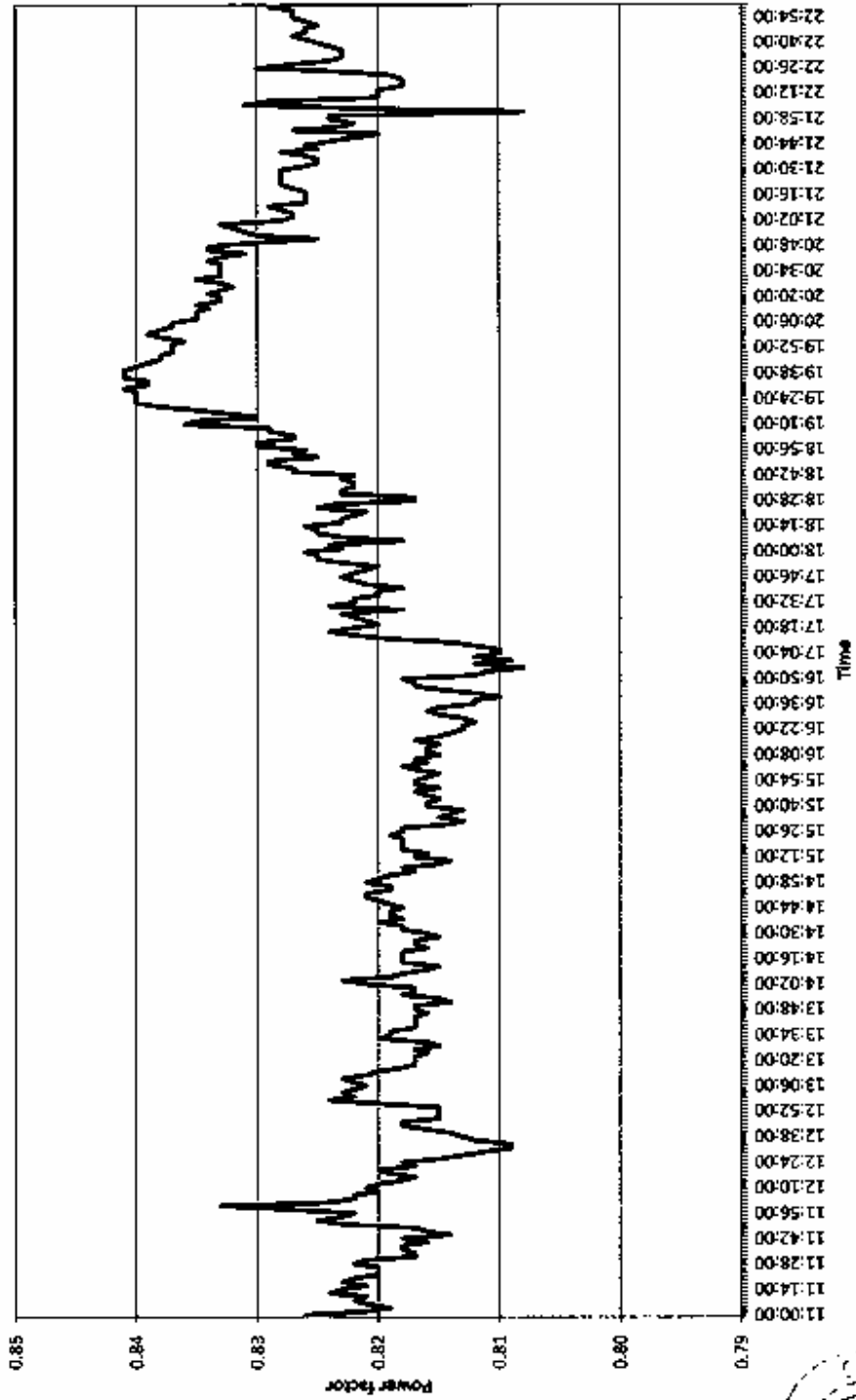


Figure 6: input power factor variation to the lamp with save switch

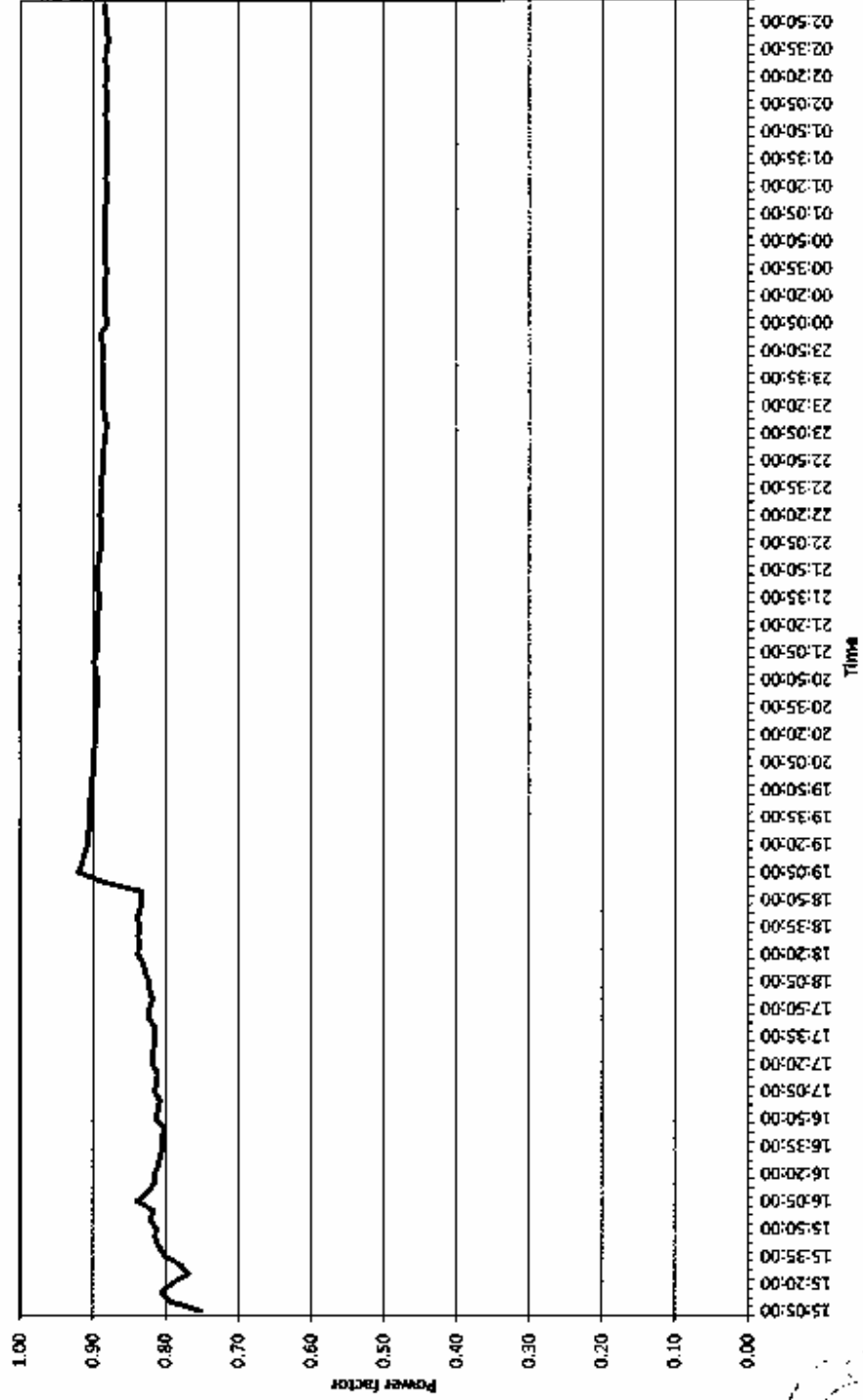


Figure 7: Input power variation to the lamp without save switch

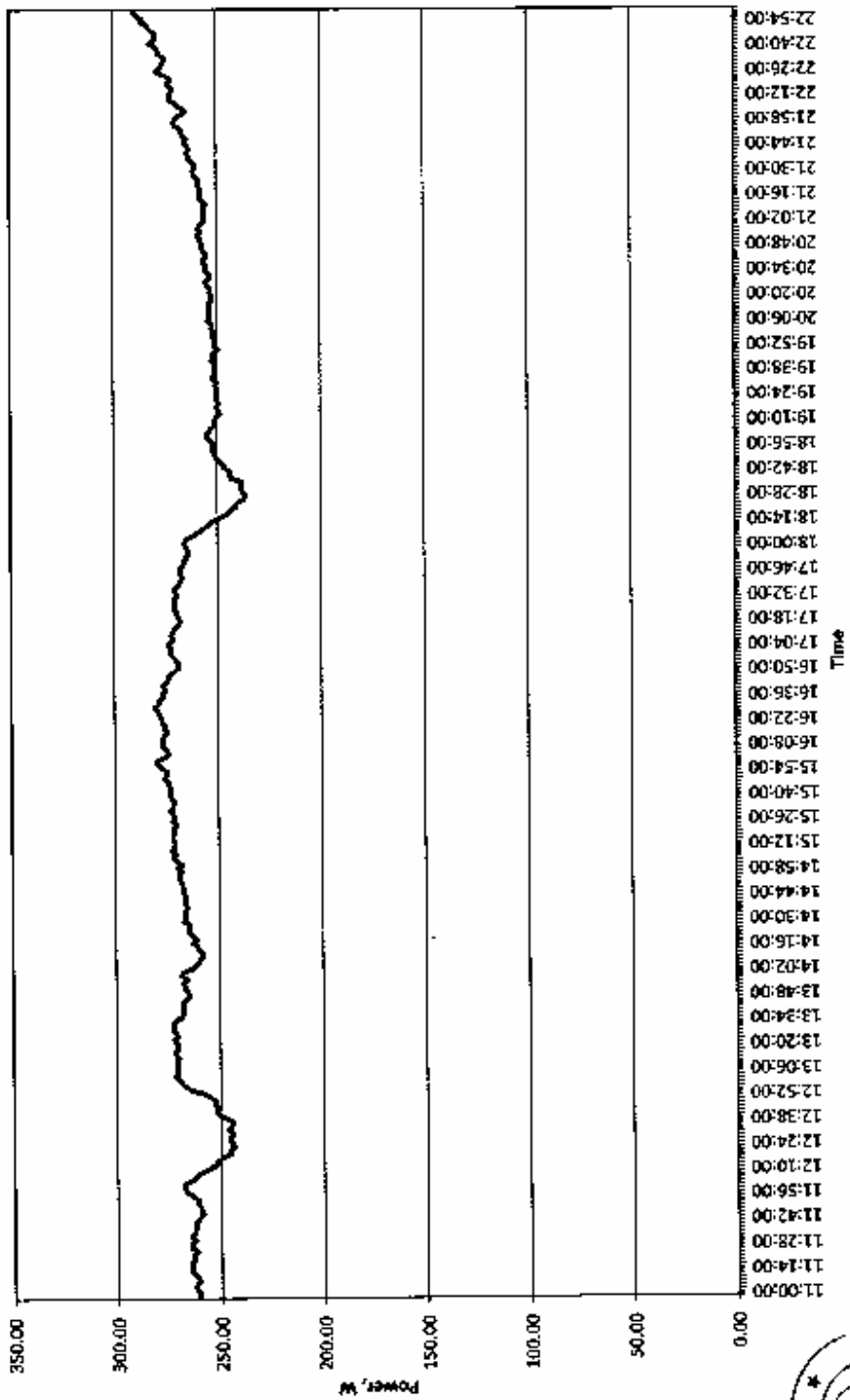


Figure 8: Input power variation to the lamp with save switch

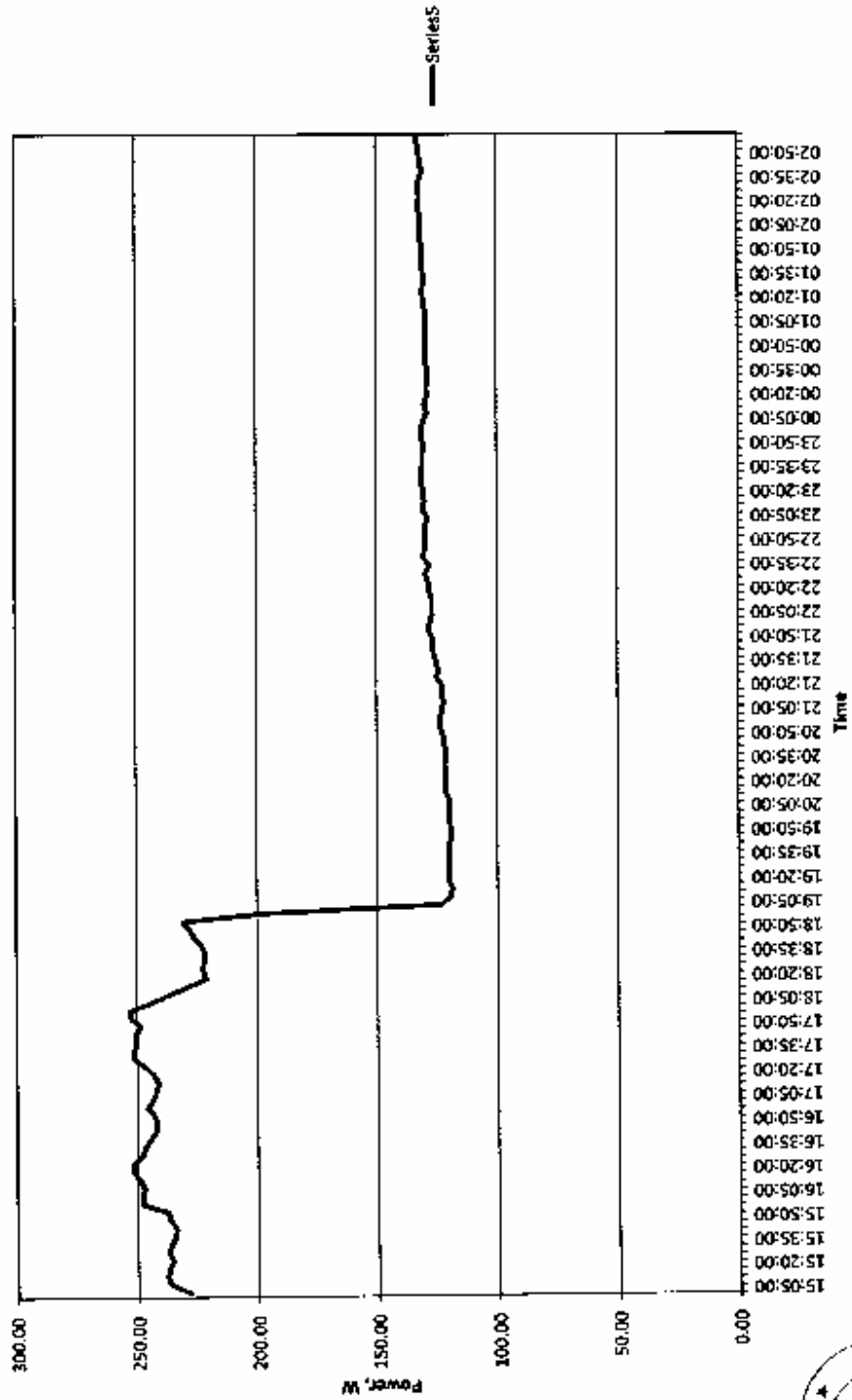


Figure 9: Input voltage harmonics without save switch

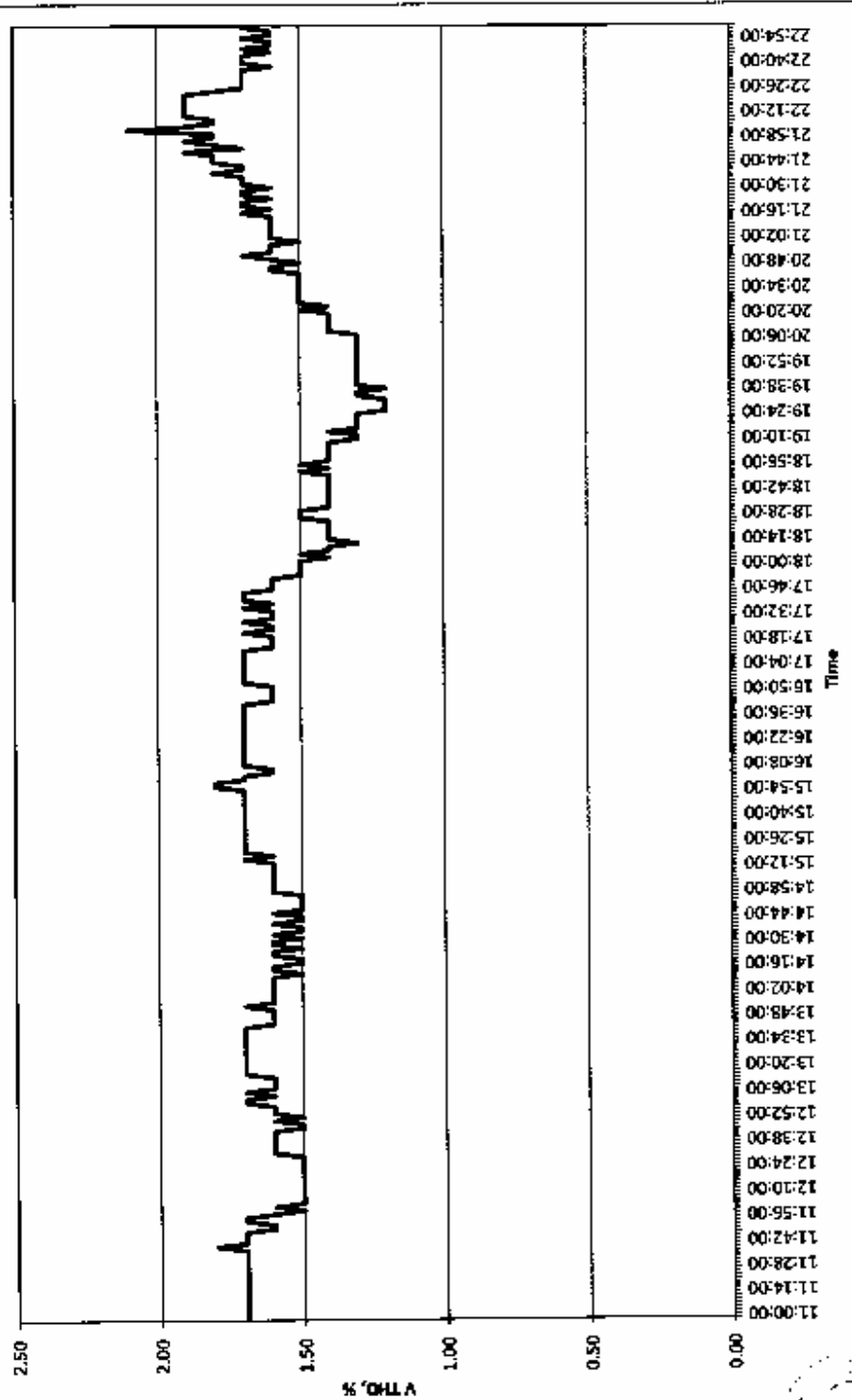


Figure 10: Input voltage harmonics with save switch

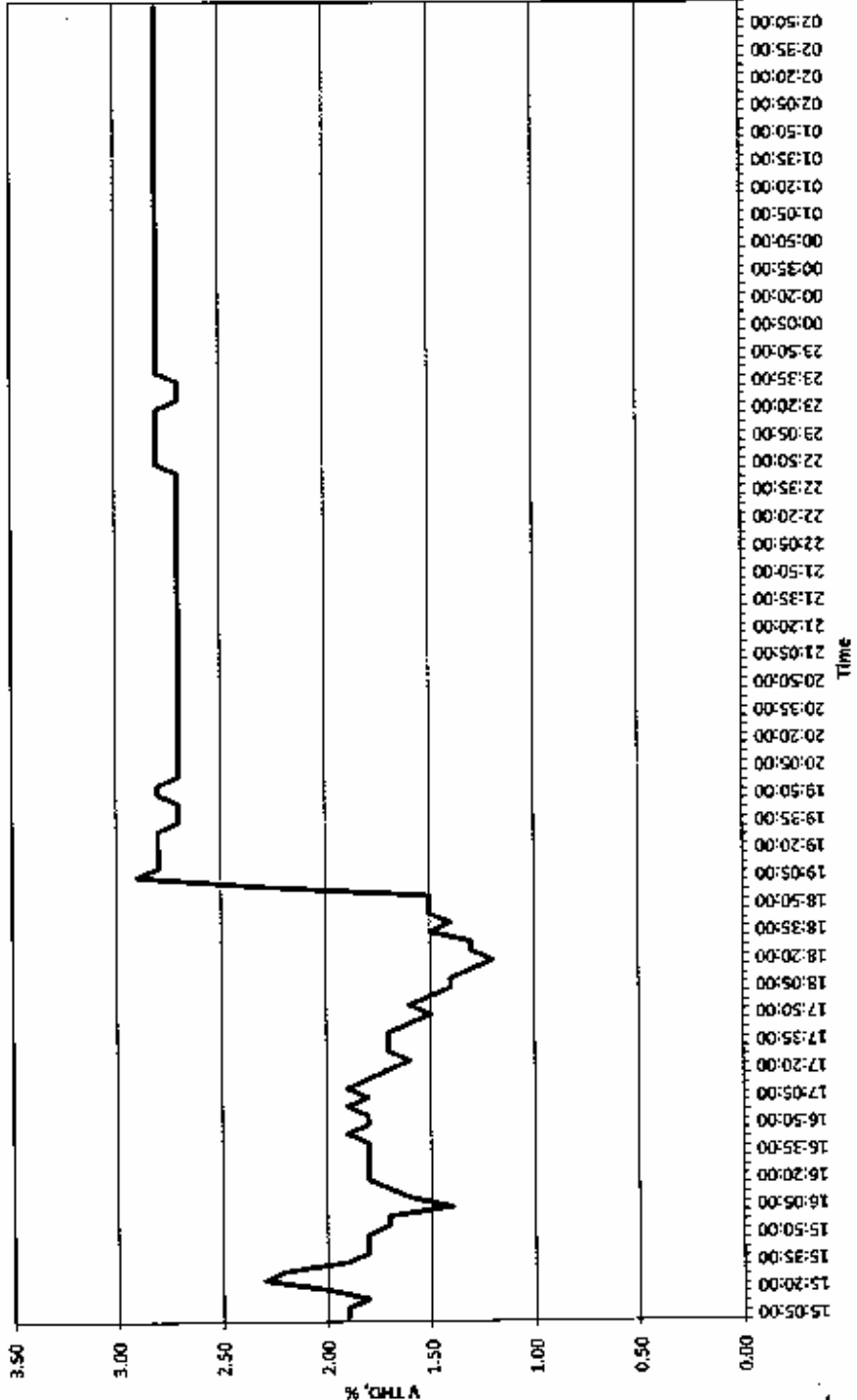


Figure 11: Input current harmonics variation without save switch

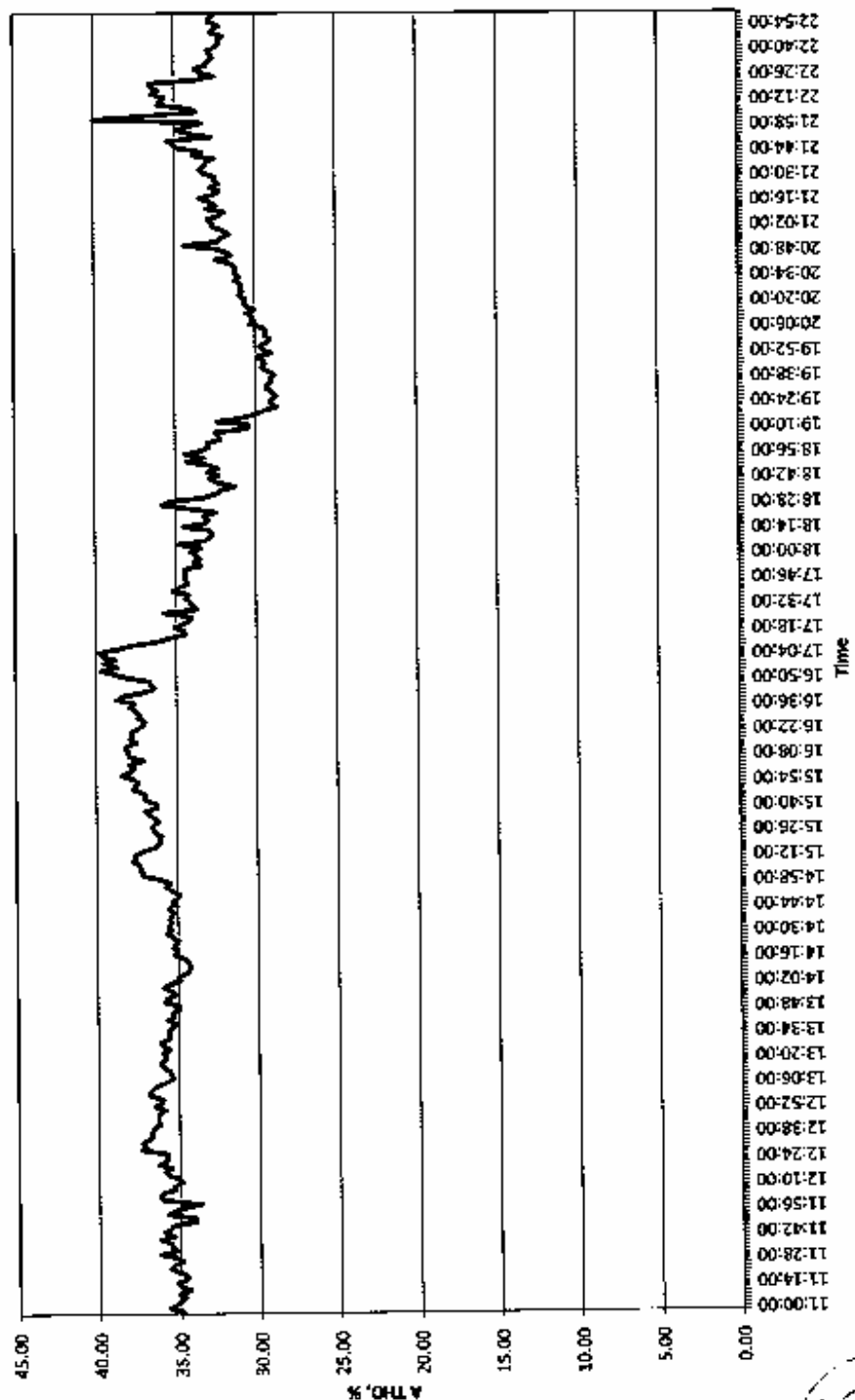


Figure 12: Input current harmonics variation with save switch

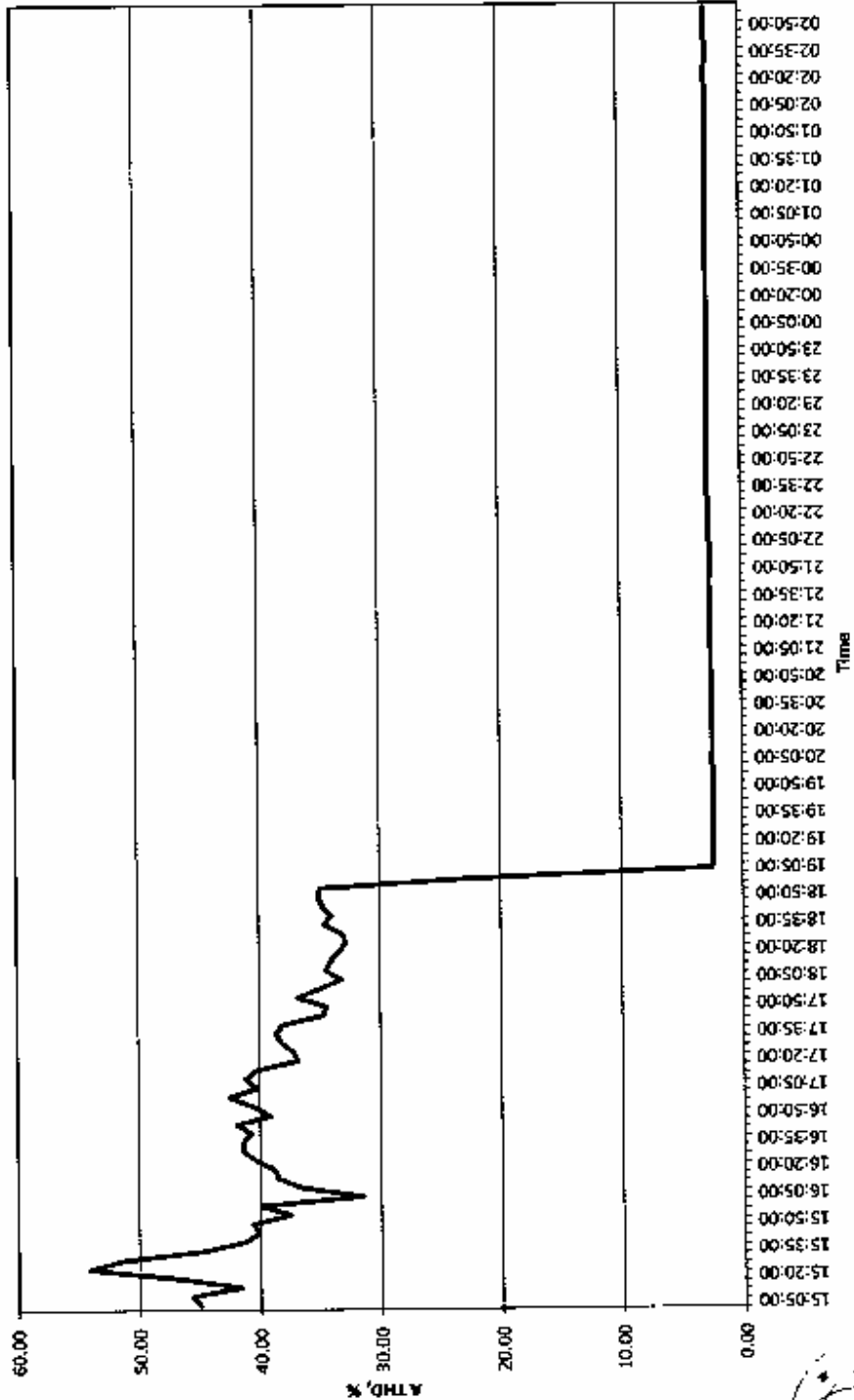


Table 1. Measured Electrical parameters without save switch

Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
08-10-2011	11:00:00	49.61	238.90	1.32	0.83	260.48	1.70	34.90	111.18
08-10-2011	11:02:00	49.49	238.80	1.33	0.82	260.75	1.70	35.70	119.92
08-10-2011	11:04:00	49.34	238.40	1.34	0.82	261.63	1.70	35.30	128.68
08-10-2011	11:06:00	49.39	238.50	1.34	0.82	262.38	1.70	35.00	137.43
08-10-2011	11:08:00	49.45	238.60	1.33	0.82	260.85	1.70	34.70	146.17
08-10-2011	11:10:00	49.52	239.20	1.33	0.82	261.19	1.70	35.10	154.94
08-10-2011	11:12:00	49.59	239.70	1.33	0.82	262.69	1.70	34.40	163.73
08-10-2011	11:14:00	49.58	239.90	1.34	0.82	264.57	1.70	35.00	172.56
08-10-2011	11:16:00	49.55	239.80	1.34	0.82	263.81	1.70	35.20	181.39
08-10-2011	11:18:00	49.54	239.70	1.34	0.82	264.35	1.70	34.60	190.21
08-10-2011	11:20:00	49.53	239.40	1.34	0.82	263.69	1.70	34.60	199.01
08-10-2011	11:22:00	49.52	239.50	1.34	0.82	263.16	1.70	35.10	207.81
08-10-2011	11:24:00	49.59	239.60	1.34	0.82	263.27	1.70	35.60	216.6
08-10-2011	11:26:00	49.66	239.90	1.33	0.82	261.63	1.70	35.40	225.38
08-10-2011	11:28:00	49.67	240.30	1.34	0.82	264.69	1.70	34.90	234.21
08-10-2011	11:30:00	49.62	240.00	1.34	0.82	264.03	1.70	35.20	243.04
08-10-2011	11:32:00	49.59	239.70	1.34	0.82	262.42	1.70	36.20	251.84
08-10-2011	11:34:00	49.50	239.80	1.35	0.82	264.49	1.70	35.20	260.69
08-10-2011	11:36:00	49.53	239.60	1.34	0.82	262.63	1.70	35.50	269.5
08-10-2011	11:38:00	49.59	239.60	1.34	0.82	262.63	1.70	35.60	278.3
08-10-2011	11:40:00	49.59	239.60	1.34	0.82	261.99	1.80	36.20	287.1
08-10-2011	11:42:00	49.54	239.00	1.34	0.82	261.97	1.70	35.40	295.84
08-10-2011	11:44:00	49.51	238.70	1.34	0.81	260.36	1.70	36.00	304.56
08-10-2011	11:46:00	49.54	238.50	1.33	0.82	258.84	1.70	35.60	313.25
08-10-2011	11:48:00	49.61	238.90	1.33	0.82	259.59	1.70	35.40	321.93
08-10-2011	11:50:00	49.71	239.30	1.32	0.82	259.97	1.60	34.00	330.63
08-10-2011	11:52:00	49.82	239.90	1.32	0.83	261.25	1.60	34.00	339.34
08-10-2011	11:54:00	49.88	240.30	1.32	0.82	261.05	1.70	35.70	348.08
08-10-2011	11:56:00	49.90	241.10	1.33	0.82	263.58	1.70	35.40	356.9
08-10-2011	11:58:00	49.98	242.10	1.33	0.83	266.29	1.60	34.70	365.81
08-10-2011	12:00:00	50.16	243.10	1.32	0.83	267.30	1.50	33.70	374.76
08-10-2011	12:02:00	49.95	242.90	1.34	0.82	268.20	1.60	36.00	383.78
08-10-2011	12:04:00	49.80	241.50	1.34	0.82	266.01	1.50	36.20	392.7
08-10-2011	12:06:00	49.79	240.10	1.33	0.82	262.49	1.50	36.10	401.48
08-10-2011	12:08:00	49.73	239.90	1.33	0.82	261.63	1.50	35.30	410.23
08-10-2011	12:10:00	49.68	238.50	1.32	0.82	258.47	1.50	35.30	418.86
08-10-2011	12:12:00	49.64	237.30	1.31	0.82	254.91	1.50	34.90	427.37
08-10-2011	12:14:00	49.63	237.00	1.30	0.82	252.03	1.50	35.00	435.83
08-10-2011	12:16:00	49.67	236.80	1.30	0.82	251.51	1.50	35.70	444.25
08-10-2011	12:18:00	49.71	235.70	1.29	0.82	249.02	1.50	35.90	452.56
08-10-2011	12:20:00	49.76	235.30	1.27	0.82	245.04	1.50	35.50	460.78
08-10-2011	12:22:00	49.74	235.00	1.28	0.82	245.75	1.50	36.30	468.98
08-10-2011	12:24:00	49.69	234.60	1.27	0.82	243.72	1.50	35.80	477.16
08-10-2011	12:26:00	49.60	234.30	1.28	0.82	244.42	1.50	35.80	485.33
08-10-2011	12:28:00	49.51	234.30	1.29	0.81	245.73	1.50	35.70	493.54
08-10-2011	12:30:00	49.51	233.80	1.29	0.81	244.60	1.50	37.30	501.71
08-10-2011	12:32:00	49.50	234.30	1.29	0.81	244.52	1.60	37.10	509.92

contd..



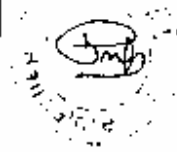
Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
08-10-2011	12:34:00	49.44	234.00	1.30	0.81	246.10	1.60	37.30	518.15
08-10-2011	12:36:00	49.48	233.60	1.29	0.81	244.69	1.60	36.80	526.32
08-10-2011	12:38:00	49.61	234.60	1.28	0.81	244.13	1.60	36.70	534.54
08-10-2011	12:40:00	49.67	235.70	1.29	0.81	247.50	1.60	36.70	542.84
08-10-2011	12:42:00	49.72	236.60	1.30	0.82	250.99	1.60	36.60	551.23
08-10-2011	12:44:00	49.72	236.70	1.30	0.82	251.71	1.60	36.20	559.64
08-10-2011	12:46:00	49.69	236.80	1.30	0.82	251.81	1.50	36.30	568.06
08-10-2011	12:48:00	49.57	236.60	1.31	0.82	252.61	1.50	36.30	576.52
08-10-2011	12:50:00	49.56	236.80	1.31	0.82	252.82	1.60	36.30	584.99
08-10-2011	12:52:00	49.54	237.30	1.32	0.82	255.29	1.50	35.90	593.54
08-10-2011	12:54:00	49.67	239.00	1.33	0.82	259.06	1.60	36.50	602.23
08-10-2011	12:56:00	49.84	240.90	1.34	0.82	264.70	1.60	36.10	611.06
08-10-2011	12:58:00	49.93	241.80	1.34	0.82	266.99	1.60	36.00	619.97
08-10-2011	13:00:00	49.95	242.50	1.35	0.82	269.10	1.70	36.80	628.96
08-10-2011	13:02:00	49.95	242.90	1.35	0.82	269.87	1.70	36.80	637.99
08-10-2011	13:04:00	49.86	242.90	1.36	0.82	271.54	1.60	36.60	647.07
08-10-2011	13:06:00	49.76	242.70	1.36	0.82	270.99	1.70	36.20	656.17
08-10-2011	13:08:00	49.75	242.40	1.36	0.82	270.98	1.60	35.70	665.24
08-10-2011	13:10:00	49.76	242.30	1.36	0.82	271.20	1.60	35.40	674.29
08-10-2011	13:12:00	49.72	242.20	1.36	0.82	270.43	1.60	35.50	683.35
08-10-2011	13:14:00	49.69	242.20	1.36	0.82	270.10	1.60	35.60	692.41
08-10-2011	13:16:00	49.65	242.20	1.37	0.82	271.42	1.70	36.00	701.5
08-10-2011	13:18:00	49.62	242.30	1.37	0.82	271.20	1.70	36.10	710.61
08-10-2011	13:20:00	49.54	241.80	1.37	0.82	270.64	1.70	35.90	719.7
08-10-2011	13:22:00	49.57	241.80	1.37	0.82	270.64	1.70	35.80	728.77
08-10-2011	13:24:00	49.56	241.70	1.38	0.82	272.17	1.70	36.00	737.83
08-10-2011	13:26:00	49.55	241.60	1.37	0.82	270.42	1.70	35.60	746.89
08-10-2011	13:28:00	49.54	241.80	1.38	0.82	271.95	1.70	36.00	755.97
08-10-2011	13:30:00	49.60	242.20	1.38	0.82	272.74	1.70	36.10	765.07
08-10-2011	13:32:00	49.71	242.60	1.37	0.82	272.54	1.70	35.60	774.17
08-10-2011	13:34:00	49.69	242.30	1.37	0.82	271.87	1.70	35.60	783.25
08-10-2011	13:36:00	49.65	241.70	1.36	0.82	269.22	1.70	35.60	792.27
08-10-2011	13:38:00	49.60	241.20	1.36	0.82	268.00	1.70	35.40	801.26
08-10-2011	13:40:00	49.57	241.10	1.36	0.82	267.89	1.70	35.20	810.25
08-10-2011	13:42:00	49.59	240.80	1.36	0.82	267.56	1.70	35.70	819.2
08-10-2011	13:44:00	49.59	240.80	1.36	0.82	267.56	1.60	35.30	828.14
08-10-2011	13:46:00	49.58	240.80	1.36	0.82	267.23	1.60	35.40	837.08
08-10-2011	13:48:00	49.58	240.40	1.35	0.82	265.15	1.60	35.00	845.97
08-10-2011	13:50:00	49.58	240.30	1.35	0.82	265.04	1.60	35.00	854.85
08-10-2011	13:52:00	49.55	240.40	1.36	0.81	266.13	1.60	35.80	863.75
08-10-2011	13:54:00	49.62	240.80	1.36	0.82	266.90	1.70	35.70	872.67
08-10-2011	13:56:00	49.64	240.90	1.36	0.82	268.00	1.60	35.20	881.59
08-10-2011	13:58:00	49.63	240.70	1.35	0.82	265.48	1.60	35.40	890.5
08-10-2011	14:00:00	49.77	241.80	1.36	0.82	268.67	1.60	35.90	899.47
08-10-2011	14:02:00	49.81	241.80	1.35	0.82	268.00	1.60	35.60	908.43
08-10-2011	14:04:00	49.74	240.30	1.33	0.82	263.03	1.60	34.90	917.25
08-10-2011	14:06:00	49.67	239.50	1.33	0.82	260.88	1.60	35.00	926

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Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
08-10-2011	14:08:00	49.55	238.70	1.33	0.82	259.69	1.60	34.50	934.71
08-10-2011	14:10:00	49.48	238.10	1.33	0.82	258.41	1.60	34.30	943.37
08-10-2011	14:12:00	49.47	237.90	1.33	0.82	257.87	1.50	34.20	952.02
08-10-2011	14:14:00	49.63	238.70	1.33	0.82	259.69	1.60	34.40	960.68
08-10-2011	14:16:00	49.69	239.60	1.33	0.82	260.67	1.60	34.60	969.42
08-10-2011	14:18:00	49.71	239.80	1.34	0.82	262.85	1.50	35.20	978.18
08-10-2011	14:20:00	49.71	239.80	1.33	0.82	260.89	1.50	35.10	986.94
08-10-2011	14:22:00	49.67	240.30	1.34	0.82	262.75	1.60	35.30	995.78
08-10-2011	14:24:00	49.60	240.10	1.35	0.82	264.82	1.60	35.20	1004.6
08-10-2011	14:26:00	49.58	240.10	1.35	0.82	264.82	1.50	35.00	1013.5
08-10-2011	14:28:00	49.56	240.20	1.35	0.82	264.28	1.60	35.30	1022.4
08-10-2011	14:30:00	49.61	240.70	1.36	0.82	267.12	1.60	35.70	1031.3
08-10-2011	14:32:00	49.67	241.00	1.35	0.82	266.14	1.50	35.40	1040.2
08-10-2011	14:34:00	49.70	240.90	1.35	0.82	266.03	1.60	35.60	1049.1
08-10-2011	14:36:00	49.71	240.70	1.35	0.82	266.45	1.50	35.40	1058
08-10-2011	14:38:00	49.68	240.50	1.35	0.82	265.58	1.50	35.50	1066.9
08-10-2011	14:40:00	49.73	240.90	1.35	0.82	266.35	1.60	35.40	1075.8
08-10-2011	14:42:00	49.75	241.10	1.35	0.82	266.57	1.50	35.30	1084.7
08-10-2011	14:44:00	49.71	241.30	1.35	0.82	266.47	1.50	35.60	1093.6
08-10-2011	14:46:00	49.71	241.50	1.35	0.82	267.01	1.60	35.30	1102.6
08-10-2011	14:48:00	49.75	241.50	1.35	0.82	267.34	1.50	35.30	1111.6
08-10-2011	14:50:00	49.76	241.60	1.35	0.82	267.78	1.50	35.00	1120.5
08-10-2011	14:52:00	49.76	241.80	1.35	0.82	268.00	1.50	34.90	1129.5
08-10-2011	14:54:00	49.72	241.80	1.36	0.82	269.33	1.50	35.40	1138.5
08-10-2011	14:56:00	49.73	242.00	1.36	0.82	269.55	1.50	35.70	1147.5
08-10-2011	14:58:00	49.78	242.00	1.35	0.82	268.22	1.60	35.50	1156.6
08-10-2011	15:00:00	49.81	242.00	1.36	0.82	269.88	1.60	36.00	1165.5
08-10-2011	15:02:00	49.94	242.40	1.35	0.82	268.01	1.60	37.10	1174.5
08-10-2011	15:04:00	49.91	243.00	1.36	0.82	270.00	1.60	37.20	1183.6
08-10-2011	15:06:00	49.85	242.80	1.37	0.82	272.10	1.60	37.30	1192.7
08-10-2011	15:08:00	49.76	242.50	1.37	0.82	270.76	1.60	37.40	1201.8
08-10-2011	15:10:00	49.71	242.60	1.38	0.81	272.52	1.60	37.70	1210.9
08-10-2011	15:12:00	49.80	242.40	1.37	0.82	271.32	1.60	37.60	1219.9
08-10-2011	15:14:00	49.83	242.60	1.37	0.82	271.21	1.60	37.60	1229
08-10-2011	15:16:00	49.85	242.80	1.37	0.82	272.10	1.70	37.00	1238.1
08-10-2011	15:18:00	49.78	242.80	1.37	0.82	272.10	1.60	36.30	1247.2
08-10-2011	15:20:00	49.68	242.30	1.37	0.82	271.54	1.70	36.10	1256.3
08-10-2011	15:22:00	49.72	242.40	1.37	0.82	271.65	1.70	36.10	1265.4
08-10-2011	15:24:00	49.80	242.70	1.36	0.82	270.33	1.70	36.00	1274.5
08-10-2011	15:26:00	49.79	242.80	1.37	0.82	272.10	1.70	36.40	1283.6
08-10-2011	15:28:00	49.73	242.40	1.37	0.82	271.65	1.70	36.50	1292.7
08-10-2011	15:30:00	49.62	242.20	1.38	0.81	272.07	1.70	36.50	1301.8
08-10-2011	15:32:00	49.51	242.00	1.39	0.81	273.48	1.70	36.20	1310.9
08-10-2011	15:34:00	49.57	241.90	1.38	0.82	272.06	1.70	36.40	1320
08-10-2011	15:36:00	49.60	242.00	1.38	0.81	271.84	1.70	36.70	1329.1
08-10-2011	15:38:00	49.63	242.30	1.38	0.81	271.85	1.70	37.00	1338.2
08-10-2011	15:40:00	49.67	242.60	1.38	0.82	273.19	1.70	36.30	1347.3
08-10-2011	15:42:00	49.64	242.80	1.38	0.82	273.41	1.70	36.30	1356.5

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Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
08-10-2011	15:44:00	49.67	242.90	1.38	0.82	273.19	1.70	36.90	1365.7
08-10-2011	15:46:00	49.71	243.20	1.38	0.82	273.86	1.70	37.00	1374.9
08-10-2011	15:48:00	49.76	243.30	1.38	0.82	274.31	1.70	37.00	1384
08-10-2011	15:50:00	49.78	243.70	1.39	0.82	276.08	1.70	37.70	1393.3
08-10-2011	15:52:00	49.81	243.80	1.38	0.82	274.87	1.70	37.60	1402.5
08-10-2011	15:54:00	49.82	244.00	1.38	0.82	275.10	1.70	37.40	1411.7
08-10-2011	15:56:00	49.84	244.70	1.39	0.82	277.55	1.80	37.70	1421
08-10-2011	15:58:00	49.81	244.90	1.40	0.82	279.43	1.80	38.40	1430.4
08-10-2011	16:00:00	49.78	244.70	1.40	0.82	279.89	1.70	37.90	1439.8
08-10-2011	16:02:00	49.82	243.90	1.38	0.82	275.32	1.70	37.70	1449
08-10-2011	16:04:00	49.79	243.50	1.38	0.82	274.20	1.60	37.90	1458.2
08-10-2011	16:06:00	49.79	243.80	1.38	0.82	274.87	1.60	37.10	1467.5
08-10-2011	16:08:00	49.78	244.10	1.39	0.82	276.53	1.70	37.90	1476.7
08-10-2011	16:10:00	49.80	243.90	1.39	0.82	276.64	1.70	38.00	1486
08-10-2011	16:12:00	49.80	243.90	1.39	0.82	276.64	1.70	38.10	1495.2
08-10-2011	16:14:00	49.79	243.80	1.39	0.82	276.19	1.70	38.10	1504.5
08-10-2011	16:16:00	49.80	243.60	1.38	0.82	274.65	1.70	37.50	1513.7
08-10-2011	16:18:00	49.80	243.80	1.39	0.82	276.19	1.70	37.90	1522.9
08-10-2011	16:20:00	49.73	243.70	1.39	0.81	275.74	1.70	37.80	1532.2
08-10-2011	16:22:00	49.68	243.50	1.40	0.81	277.15	1.70	37.80	1541.4
08-10-2011	16:24:00	49.62	243.70	1.40	0.81	277.38	1.70	37.40	1550.7
08-10-2011	16:26:00	49.50	243.30	1.41	0.81	278.56	1.70	37.10	1560
08-10-2011	16:28:00	49.55	243.60	1.41	0.81	279.25	1.70	37.00	1569.3
08-10-2011	16:30:00	49.65	244.10	1.41	0.82	280.51	1.70	37.40	1578.7
08-10-2011	16:32:00	49.69	244.00	1.40	0.82	278.75	1.70	37.30	1588
08-10-2011	16:34:00	49.68	243.80	1.40	0.82	278.18	1.70	37.60	1597.3
08-10-2011	16:36:00	49.58	243.30	1.40	0.81	276.58	1.70	37.90	1606.6
08-10-2011	16:38:00	49.56	243.10	1.40	0.81	276.36	1.70	37.60	1615.8
08-10-2011	16:40:00	49.61	243.20	1.40	0.81	275.79	1.70	38.70	1625.1
08-10-2011	16:42:00	49.65	243.30	1.40	0.81	276.58	1.70	38.20	1634.3
08-10-2011	16:44:00	49.65	243.10	1.39	0.82	275.40	1.60	37.00	1643.5
08-10-2011	16:46:00	49.67	242.90	1.38	0.82	273.86	1.60	36.40	1652.7
08-10-2011	16:48:00	49.67	242.70	1.38	0.82	273.63	1.60	36.60	1661.9
08-10-2011	16:50:00	49.69	242.10	1.37	0.82	271.31	1.60	36.70	1671
08-10-2011	16:52:00	49.71	241.70	1.37	0.81	268.88	1.60	38.10	1680
08-10-2011	16:54:00	49.75	242.00	1.37	0.81	268.88	1.70	38.80	1689
08-10-2011	16:56:00	49.75	242.20	1.38	0.81	270.06	1.70	39.70	1698.1
08-10-2011	16:58:00	49.78	242.50	1.38	0.81	271.74	1.70	38.70	1707.1
08-10-2011	17:00:00	49.77	242.80	1.39	0.81	273.09	1.70	39.50	1716.2
08-10-2011	17:02:00	49.77	243.00	1.38	0.81	272.30	1.70	38.80	1725.4
08-10-2011	17:04:00	49.79	242.90	1.39	0.81	273.48	1.70	39.60	1734.5
08-10-2011	17:06:00	49.81	243.10	1.39	0.81	273.71	1.70	39.80	1743.7
08-10-2011	17:08:00	49.76	242.60	1.38	0.81	271.85	1.70	38.70	1752.8
08-10-2011	17:10:00	49.74	242.70	1.38	0.81	272.63	1.70	37.80	1761.9
08-10-2011	17:12:00	49.73	242.60	1.37	0.82	272.20	1.70	36.20	1771
08-10-2011	17:14:00	49.74	242.30	1.36	0.82	270.87	1.60	35.50	1780.1
08-10-2011	17:16:00	49.75	242.10	1.35	0.82	269.31	1.60	34.50	1789.1
08-10-2011	17:18:00	49.70	241.80	1.35	0.82	268.33	1.60	34.50	1798.1

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Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
08-10-2011	17:20:00	49.64	241.30	1.36	0.82	269.10	1.60	35.10	1807.1
08-10-2011	17:24:00	49.70	241.90	1.36	0.82	270.42	1.60	34.10	1825.2
08-10-2011	17:26:00	49.71	242.10	1.36	0.82	270.98	1.60	34.10	1834.2
08-10-2011	17:28:00	49.67	242.10	1.37	0.82	271.31	1.70	35.70	1843.3
08-10-2011	17:30:00	49.68	242.10	1.36	0.82	271.31	1.60	33.70	1852.3
08-10-2011	17:32:00	49.61	241.80	1.36	0.82	270.31	1.60	34.00	1861.4
08-10-2011	17:34:00	49.60	241.70	1.36	0.82	270.20	1.60	34.10	1870.5
08-10-2011	17:36:00	49.55	241.50	1.37	0.82	271.30	1.70	34.40	1879.5
08-10-2011	17:38:00	49.51	241.10	1.36	0.82	268.87	1.60	34.20	1888.5
08-10-2011	17:40:00	49.58	241.40	1.36	0.82	268.55	1.70	35.20	1897.5
08-10-2011	17:42:00	49.63	241.30	1.35	0.82	267.44	1.70	34.80	1906.5
08-10-2011	17:44:00	49.66	241.40	1.35	0.82	267.88	1.70	34.30	1915.5
08-10-2011	17:46:00	49.68	241.20	1.35	0.82	267.99	1.60	34.40	1924.5
08-10-2011	17:48:00	49.71	241.30	1.35	0.82	267.77	1.60	34.40	1933.4
08-10-2011	17:50:00	49.62	240.70	1.35	0.82	266.78	1.60	34.40	1942.3
08-10-2011	17:52:00	49.56	240.30	1.35	0.82	266.01	1.60	34.40	1951.3
08-10-2011	17:54:00	49.59	240.20	1.34	0.82	264.90	1.50	33.40	1960.1
08-10-2011	17:56:00	49.77	240.40	1.33	0.83	263.78	1.50	33.90	1969
08-10-2011	17:58:00	49.82	241.00	1.33	0.83	264.44	1.50	33.50	1977.8
08-10-2011	18:00:00	49.89	241.80	1.33	0.83	265.64	1.50	33.80	1986.7
08-10-2011	18:02:00	49.72	241.20	1.34	0.82	266.00	1.50	34.10	1995.7
08-10-2011	18:04:00	49.60	240.00	1.34	0.82	265.00	1.40	33.40	2004.5
08-10-2011	18:06:00	49.49	238.90	1.34	0.82	261.86	1.50	34.80	2013.3
08-10-2011	18:08:00	49.58	238.70	1.32	0.82	259.31	1.40	33.20	2022
08-10-2011	18:10:00	49.59	237.70	1.31	0.83	256.89	1.40	32.80	2030.6
08-10-2011	18:12:00	49.68	237.30	1.30	0.83	254.50	1.30	32.70	2039.1
08-10-2011	18:14:00	49.73	237.20	1.29	0.83	252.75	1.40	32.90	2047.5
08-10-2011	18:16:00	49.74	235.80	1.28	0.82	248.40	1.40	34.50	2055.8
08-10-2011	18:18:00	49.61	234.50	1.27	0.82	245.10	1.40	33.10	2064
08-10-2011	18:20:00	49.55	233.60	1.27	0.82	243.86	1.40	33.00	2072.2
08-10-2011	18:22:00	49.55	233.30	1.26	0.82	241.34	1.40	33.20	2080.3
08-10-2011	18:24:00	49.65	233.40	1.25	0.83	240.69	1.40	32.50	2088.4
08-10-2011	18:26:00	49.68	232.40	1.24	0.82	237.46	1.50	34.10	2096.3
08-10-2011	18:28:00	49.64	231.90	1.25	0.82	236.83	1.50	35.80	2104.3
08-10-2011	18:30:00	49.61	232.30	1.25	0.82	237.24	1.50	35.30	2112.3
08-10-2011	18:32:00	49.57	232.10	1.25	0.82	238.77	1.40	33.20	2120.2
08-10-2011	18:34:00	49.49	231.90	1.25	0.82	238.57	1.40	32.50	2128.2
08-10-2011	18:36:00	49.42	231.80	1.25	0.82	238.17	1.40	32.10	2136.2
08-10-2011	18:38:00	49.40	233.10	1.27	0.82	243.34	1.40	31.30	2144.4
08-10-2011	18:40:00	49.41	233.40	1.27	0.82	243.95	1.40	32.30	2152.5
08-10-2011	18:42:00	49.45	233.60	1.27	0.82	243.86	1.40	32.90	2160.7
08-10-2011	18:44:00	49.57	234.60	1.27	0.83	246.40	1.40	32.30	2169
08-10-2011	18:46:00	49.68	235.50	1.27	0.83	247.34	1.40	33.00	2177.3
08-10-2011	18:48:00	49.70	236.10	1.27	0.83	248.57	1.40	32.30	2185.6
08-10-2011	18:50:00	49.71	236.20	1.28	0.83	250.64	1.40	33.00	2194
08-10-2011	18:52:00	49.68	236.30	1.29	0.83	251.48	1.50	34.30	2202.4
08-10-2011	18:54:00	49.68	236.70	1.29	0.83	252.52	1.40	33.20	2210.8

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Date	Time	H <sub>z</sub>	V	A	PF	W	VTHD	ATHD	Wh
08-10-2011	18:56:00	49.69	236.70	1.29	0.83	252.21	1.50	34.40	2219.3
08-10-2011	19:00:00	49.79	237.60	1.29	0.83	254.40	1.40	32.90	2236.2
08-10-2011	19:02:00	49.58	237.00	1.30	0.83	254.80	1.40	33.00	2244.7
08-10-2011	19:04:00	49.49	236.50	1.30	0.83	254.26	1.40	32.20	2253.2
08-10-2011	19:06:00	49.58	236.50	1.29	0.83	252.92	1.40	32.30	2261.7
08-10-2011	19:08:00	49.63	236.20	1.28	0.83	250.64	1.40	32.50	2270.1
08-10-2011	19:10:00	49.72	236.20	1.27	0.84	250.78	1.30	30.50	2278.5
08-10-2011	19:12:00	49.71	236.20	1.27	0.84	250.48	1.30	30.40	2286.8
08-10-2011	19:14:00	49.67	235.70	1.27	0.83	248.45	1.40	32.40	2295.2
08-10-2011	19:16:00	49.64	235.90	1.27	0.83	249.26	1.30	30.70	2303.5
08-10-2011	19:18:00	49.64	235.90	1.27	0.84	250.16	1.30	30.00	2311.9
08-10-2011	19:20:00	49.72	236.10	1.26	0.84	249.29	1.30	29.40	2320.3
08-10-2011	19:22:00	49.77	236.30	1.26	0.84	250.10	1.30	28.70	2328.6
08-10-2011	19:24:00	49.79	236.40	1.26	0.84	250.21	1.30	29.10	2337
08-10-2011	19:26:00	49.78	236.40	1.26	0.84	250.21	1.20	29.00	2345.3
08-10-2011	19:28:00	49.77	236.30	1.26	0.84	250.10	1.20	28.70	2353.7
08-10-2011	19:30:00	49.80	236.50	1.26	0.84	250.61	1.20	28.90	2362.1
08-10-2011	19:32:00	49.81	236.70	1.26	0.84	250.23	1.20	29.30	2370.4
08-10-2011	19:34:00	49.80	237.00	1.27	0.84	252.53	1.30	29.30	2378.9
08-10-2011	19:36:00	49.82	237.10	1.26	0.84	251.25	1.30	29.00	2387.3
08-10-2011	19:38:00	49.81	237.10	1.26	0.84	251.25	1.20	29.00	2395.7
08-10-2011	19:40:00	49.79	237.20	1.26	0.84	251.35	1.30	28.80	2404.2
08-10-2011	19:42:00	49.77	237.10	1.26	0.84	250.95	1.30	29.20	2412.6
08-10-2011	19:44:00	49.75	236.90	1.27	0.84	252.42	1.30	29.60	2421
08-10-2011	19:46:00	49.71	236.30	1.27	0.84	251.48	1.30	29.40	2429.4
08-10-2011	19:48:00	49.74	236.50	1.27	0.84	251.70	1.30	29.50	2437.8
08-10-2011	19:50:00	49.73	236.40	1.26	0.84	249.31	1.30	29.90	2446.2
08-10-2011	19:52:00	49.68	236.40	1.27	0.84	251.29	1.30	29.00	2454.6
08-10-2011	19:54:00	49.68	236.50	1.27	0.84	251.40	1.30	29.50	2463
08-10-2011	19:56:00	49.68	236.60	1.27	0.84	251.20	1.30	29.70	2471.4
08-10-2011	19:58:00	49.68	236.50	1.27	0.84	251.70	1.30	29.30	2479.9
08-10-2011	20:00:00	49.72	236.70	1.27	0.84	252.21	1.30	29.10	2488.3
08-10-2011	20:02:00	49.75	236.90	1.27	0.84	252.12	1.30	29.40	2496.7
08-10-2011	20:04:00	49.71	237.20	1.27	0.84	252.14	1.30	29.30	2505.2
08-10-2011	20:06:00	49.69	237.40	1.28	0.84	254.34	1.30	29.50	2513.7
08-10-2011	20:08:00	49.66	237.20	1.28	0.84	253.52	1.30	30.30	2522.2
08-10-2011	20:10:00	49.64	237.10	1.28	0.84	253.41	1.40	30.10	2530.7
08-10-2011	20:12:00	49.64	237.10	1.28	0.84	253.41	1.40	30.20	2539.2
08-10-2011	20:14:00	49.66	237.10	1.28	0.83	253.11	1.40	30.50	2547.7
08-10-2011	20:16:00	49.65	237.00	1.28	0.84	253.31	1.40	30.00	2556.2
08-10-2011	20:18:00	49.60	236.50	1.28	0.83	252.17	1.40	30.60	2564.7
08-10-2011	20:20:00	49.63	236.70	1.28	0.83	252.38	1.40	30.70	2573.1
08-10-2011	20:22:00	49.68	237.20	1.28	0.83	253.22	1.50	30.60	2581.6
08-10-2011	20:24:00	49.65	237.20	1.28	0.83	252.91	1.40	31.00	2590.1
08-10-2011	20:26:00	49.63	237.20	1.29	0.83	254.58	1.50	30.80	2598.6
08-10-2011	20:28:00	49.67	237.50	1.29	0.83	255.21	1.50	30.90	2607.2
08-10-2011	20:30:00	49.69	237.10	1.28	0.84	253.41	1.50	30.90	2615.6

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Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
08-10-2011	20:32:00	49.70	237.20	1.28	0.83	252.91	1.50	31.20	2624.1
08-10-2011	20:36:00	49.71	237.60	1.29	0.83	255.32	1.50	31.30	2641.2
08-10-2011	20:38:00	49.74	238.00	1.29	0.83	255.75	1.50	31.20	2649.7
08-10-2011	20:40:00	49.76	238.20	1.29	0.83	256.27	1.50	31.20	2658.3
08-10-2011	20:42:00	49.72	237.80	1.29	0.83	255.53	1.50	31.60	2666.9
08-10-2011	20:44:00	49.74	237.90	1.29	0.83	255.03	1.60	32.40	2675.4
08-10-2011	20:46:00	49.81	238.60	1.29	0.83	256.70	1.60	31.50	2684
08-10-2011	20:48:00	49.77	238.50	1.29	0.83	256.59	1.50	31.70	2692.6
08-10-2011	20:50:00	49.71	238.60	1.30	0.83	257.45	1.60	32.40	2701.3
08-10-2011	20:52:00	49.68	238.50	1.31	0.83	257.76	1.70	34.40	2709.9
08-10-2011	20:54:00	49.66	238.50	1.31	0.83	259.32	1.60	32.30	2718.6
08-10-2011	20:56:00	49.71	238.70	1.30	0.83	257.87	1.60	32.10	2727.2
08-10-2011	20:58:00	49.75	239.20	1.30	0.83	258.72	1.60	31.60	2735.9
08-10-2011	21:00:00	49.72	238.50	1.30	0.83	258.27	1.50	32.00	2744.5
08-10-2011	21:02:00	49.62	237.90	1.30	0.83	256.08	1.60	32.60	2753.1
08-10-2011	21:04:00	49.59	237.80	1.30	0.83	255.66	1.60	32.60	2761.7
08-10-2011	21:06:00	49.64	237.80	1.30	0.83	255.66	1.60	32.90	2770.3
08-10-2011	21:08:00	49.64	238.00	1.30	0.83	256.18	1.60	32.20	2778.9
08-10-2011	21:10:00	49.63	237.80	1.30	0.83	256.28	1.60	31.90	2787.5
08-10-2011	21:12:00	49.59	237.50	1.30	0.83	255.03	1.60	33.00	2796.1
08-10-2011	21:14:00	49.59	237.90	1.31	0.83	257.42	1.60	32.40	2804.7
08-10-2011	21:16:00	49.61	238.20	1.31	0.83	257.75	1.70	32.90	2813.3
08-10-2011	21:18:00	49.62	238.10	1.31	0.83	257.64	1.60	33.40	2821.9
08-10-2011	21:20:00	49.60	238.30	1.31	0.83	258.17	1.70	32.50	2830.6
08-10-2011	21:22:00	49.61	238.40	1.31	0.83	258.59	1.70	32.20	2839.3
08-10-2011	21:24:00	49.63	238.40	1.31	0.83	258.59	1.60	32.80	2847.9
08-10-2011	21:26:00	49.62	238.80	1.31	0.83	259.02	1.70	32.20	2856.6
08-10-2011	21:28:00	49.61	238.80	1.32	0.83	261.00	1.70	32.50	2865.3
08-10-2011	21:30:00	49.63	238.90	1.32	0.83	261.11	1.60	32.50	2874
08-10-2011	21:32:00	49.61	239.10	1.32	0.83	260.70	1.70	33.20	2882.8
08-10-2011	21:34:00	49.58	239.00	1.32	0.83	260.27	1.70	33.40	2891.5
08-10-2011	21:36:00	49.59	239.40	1.33	0.83	262.68	1.70	33.10	2900.3
08-10-2011	21:38:00	49.60	239.70	1.33	0.83	263.33	1.80	33.00	2909.1
08-10-2011	21:40:00	49.61	239.70	1.33	0.83	263.97	1.70	32.50	2917.9
08-10-2011	21:42:00	49.63	239.90	1.33	0.83	263.23	1.70	33.80	2926.7
08-10-2011	21:44:00	49.66	240.50	1.33	0.83	264.21	1.80	33.30	2935.6
08-10-2011	21:46:00	49.65	240.40	1.34	0.82	265.44	1.80	34.80	2944.5
08-10-2011	21:48:00	49.63	240.20	1.34	0.82	264.58	1.80	35.00	2953.4
08-10-2011	21:50:00	49.64	240.60	1.35	0.82	266.34	1.90	35.40	2962.3
08-10-2011	21:52:00	49.61	240.80	1.34	0.83	266.85	1.70	32.70	2971.2
08-10-2011	21:54:00	49.63	241.40	1.35	0.82	268.21	1.80	34.10	2980.2
08-10-2011	21:56:00	49.63	241.80	1.36	0.82	270.31	1.90	34.80	2989.3
08-10-2011	21:58:00	49.55	241.20	1.36	0.82	270.30	1.80	34.00	2998.4
08-10-2011	22:00:00	49.47	240.70	1.36	0.82	269.74	1.80	33.30	3007.4
08-10-2011	22:02:00	49.57	240.60	1.37	0.81	266.33	2.10	40.00	3016.3
08-10-2011	22:04:00	49.82	240.90	1.34	0.82	265.02	1.90	36.90	3025.2
08-10-2011	22:06:00	50.01	242.40	1.33	0.83	267.91	1.80	33.60	3034.1

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Date	Time	Hz	V	A	PF	W	VTHD	ATHD	wh
08-10-2011	22:08:00	49.91	242.50	1.34	0.83	269.38	1.80	34.00	3043.2
08-10-2011	22:10:00	49.72	242.40	1.37	0.82	272.31	1.90	36.00	3052.2
08-10-2011	22:12:00	49.65	242.10	1.37	0.82	271.98	1.90	35.80	3061.3
08-10-2011	22:14:00	49.61	242.10	1.37	0.82	271.98	1.90	35.60	3070.5
08-10-2011	22:16:00	49.59	241.90	1.37	0.82	271.09	1.90	36.40	3079.6
08-10-2011	22:18:00	49.56	241.90	1.38	0.82	273.07	1.90	36.00	3088.7
08-10-2011	22:20:00	49.60	242.10	1.38	0.82	273.29	1.90	36.40	3097.8
08-10-2011	22:22:00	49.68	242.30	1.37	0.82	271.87	1.90	36.50	3106.9
08-10-2011	22:24:00	49.68	243.30	1.37	0.82	274.32	1.80	33.60	3116.1
08-10-2011	22:26:00	49.66	243.80	1.38	0.83	279.25	1.70	32.50	3125.4
08-10-2011	22:28:00	49.60	243.10	1.38	0.83	277.44	1.70	33.40	3134.7
08-10-2011	22:30:00	49.55	242.80	1.38	0.82	276.09	1.70	33.70	3143.9
08-10-2011	22:32:00	49.44	242.40	1.38	0.82	275.30	1.70	33.00	3153.1
08-10-2011	22:34:00	49.42	242.10	1.38	0.82	274.96	1.70	32.90	3162.3
08-10-2011	22:36:00	49.44	242.80	1.39	0.82	277.76	1.70	32.60	3171.6
08-10-2011	22:38:00	49.46	243.10	1.39	0.82	278.44	1.60	32.70	3180.9
08-10-2011	22:40:00	49.51	243.60	1.39	0.83	279.35	1.70	32.90	3190.3
08-10-2011	22:42:00	49.49	243.90	1.40	0.83	282.05	1.70	32.40	3199.7
08-10-2011	22:44:00	49.47	243.50	1.39	0.83	279.91	1.70	32.20	3209
08-10-2011	22:46:00	49.44	243.20	1.39	0.83	279.23	1.60	32.20	3218.4
08-10-2011	22:48:00	49.47	243.60	1.39	0.83	279.69	1.70	32.00	3227.8
08-10-2011	22:50:00	49.52	244.40	1.40	0.83	282.28	1.60	32.70	3237.2
08-10-2011	22:52:00	49.52	244.80	1.40	0.83	283.09	1.60	32.50	3246.7
08-10-2011	22:54:00	49.51	245.10	1.41	0.83	285.80	1.70	32.20	3256.3
08-10-2011	22:56:00	49.52	245.30	1.41	0.83	286.04	1.60	32.80	3265.8
08-10-2011	22:58:00	49.55	245.90	1.42	0.83	288.77	1.60	32.80	3275.5
08-10-2011	23:00:00	49.56	246.30	1.42	0.83	289.94	1.70	32.50	3285.1



Table 2: Measured electrical parameters with save switch

Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
07-10-2011	15:05:00	49.75	233.60	1.30	0.75	228.37	1.90	45.00	19.02
07-10-2011	15:10:00	49.66	232.90	1.28	0.79	236.40	1.90	45.60	38.83
07-10-2011	15:15:00	49.57	232.60	1.27	0.81	237.80	1.80	41.60	58.69
07-10-2011	15:20:00	49.56	232.30	1.29	0.79	237.04	2.00	46.80	78.49
07-10-2011	15:25:00	49.61	232.20	1.32	0.77	235.70	2.30	54.10	98.28
07-10-2011	15:30:00	49.70	232.60	1.31	0.78	237.37	2.20	51.30	118.1
07-10-2011	15:35:00	49.73	232.20	1.27	0.80	236.21	1.90	44.70	137.81
07-10-2011	15:40:00	49.68	231.90	1.25	0.81	234.51	1.80	41.30	157.48
07-10-2011	15:45:00	49.72	231.90	1.24	0.81	234.07	1.80	40.10	177.14
07-10-2011	15:50:00	49.76	232.80	1.25	0.81	236.58	1.80	40.60	196.99
07-10-2011	15:55:00	49.79	233.20	1.24	0.82	237.41	1.70	37.50	216.92
07-10-2011	16:00:00	49.98	237.00	1.28	0.82	247.85	1.70	39.90	237.63
07-10-2011	16:05:00	49.88	236.40	1.25	0.84	247.92	1.40	31.50	258.33
07-10-2011	16:10:00	49.83	236.10	1.27	0.82	247.07	1.60	36.50	278.99
07-10-2011	16:15:00	49.79	236.70	1.29	0.82	249.16	1.70	38.50	299.84
07-10-2011	16:20:00	49.78	237.30	1.30	0.82	251.42	1.80	38.80	320.86
07-10-2011	16:25:00	49.76	236.90	1.31	0.81	251.37	1.80	40.30	341.83
07-10-2011	16:30:00	49.77	236.40	1.30	0.81	248.01	1.80	41.40	362.65
07-10-2011	16:35:00	49.69	235.80	1.30	0.81	246.76	1.80	41.40	383.37
07-10-2011	16:40:00	49.52	234.10	1.30	0.80	244.68	1.80	40.70	403.84
07-10-2011	16:45:00	49.56	234.00	1.29	0.80	242.39	1.90	41.90	424.12
07-10-2011	16:50:00	49.73	234.20	1.27	0.81	241.81	1.80	39.10	444.39
07-10-2011	16:55:00	49.76	234.20	1.28	0.81	242.82	1.80	40.50	464.65
07-10-2011	17:00:00	49.95	235.80	1.29	0.81	245.78	1.90	42.50	485.15
07-10-2011	17:05:00	49.92	235.10	1.27	0.82	243.34	1.80	40.20	505.52
07-10-2011	17:10:00	49.88	234.70	1.27	0.81	242.03	1.90	41.20	525.84
07-10-2011	17:15:00	49.78	234.20	1.27	0.81	241.22	1.80	40.20	546.11
07-10-2011	17:20:00	49.63	233.90	1.27	0.82	242.99	1.70	36.80	566.45
07-10-2011	17:25:00	49.73	235.40	1.28	0.82	246.47	1.60	37.20	587.09
07-10-2011	17:30:00	49.78	236.70	1.30	0.82	251.09	1.70	38.20	608.04
07-10-2011	17:35:00	49.78	236.60	1.30	0.82	250.99	1.70	38.60	628.98
07-10-2011	17:40:00	49.71	236.50	1.30	0.82	250.57	1.70	38.10	649.97
07-10-2011	17:45:00	49.63	236.10	1.29	0.82	250.66	1.60	34.70	670.93
07-10-2011	17:50:00	49.66	236.00	1.28	0.82	248.61	1.50	34.50	691.82
07-10-2011	17:55:00	49.77	237.20	1.30	0.82	252.24	1.60	36.80	712.92
07-10-2011	18:00:00	49.63	236.80	1.30	0.82	253.04	1.50	34.90	734.11
07-10-2011	18:05:00	49.46	233.60	1.27	0.82	244.16	1.40	33.20	754.58
07-10-2011	18:10:00	49.79	232.40	1.23	0.83	236.69	1.40	34.50	774.43
07-10-2011	18:15:00	49.79	229.50	1.20	0.83	228.86	1.30	34.10	793.57
07-10-2011	18:20:00	49.93	227.50	1.16	0.84	221.15	1.20	33.40	812.13
07-10-2011	18:25:00	49.75	227.20	1.17	0.84	222.49	1.30	32.80	830.81
07-10-2011	18:30:00	49.70	226.60	1.17	0.84	222.17	1.30	33.10	849.42
07-10-2011	18:35:00	49.70	226.60	1.17	0.84	221.64	1.50	34.60	868.08
07-10-2011	18:40:00	49.75	227.20	1.17	0.84	223.03	1.40	34.00	886.84
07-10-2011	18:45:00	49.59	227.60	1.19	0.84	226.15	1.50	34.70	905.85
07-10-2011	18:50:00	49.60	227.70	1.20	0.83	227.88	1.50	35.10	924.88
07-10-2011	18:55:00	49.58	228.90	1.21	0.83	230.99	1.50	34.90	944.2

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Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
07-10-2011	19:00:00	49.52	210.70	1.06	0.89	197.88	2.30	22.60	960.81
07-10-2011	19:05:00	49.52	174.20	0.77	0.92	123.40	2.90	2.50	971.11
07-10-2011	19:10:00	49.77	174.00	0.75	0.92	119.41	2.80	2.40	981.15
07-10-2011	19:15:00	49.71	173.60	0.75	0.91	118.74	2.80	2.40	991.14
07-10-2011	19:20:00	49.66	173.80	0.76	0.91	119.94	2.80	2.40	1001.13
07-10-2011	19:25:00	49.64	173.80	0.76	0.91	119.80	2.80	2.40	1011.1
07-10-2011	19:30:00	49.67	174.00	0.76	0.91	119.81	2.80	2.40	1021.08
07-10-2011	19:35:00	49.69	174.10	0.76	0.91	119.88	2.70	2.40	1031.05
07-10-2011	19:40:00	49.70	174.40	0.76	0.91	120.08	2.70	2.40	1041.04
07-10-2011	19:45:00	49.64	174.00	0.76	0.90	119.54	2.70	2.40	1051
07-10-2011	19:50:00	49.59	174.00	0.76	0.90	119.28	2.80	2.40	1060.97
07-10-2011	19:55:00	49.63	174.60	0.76	0.90	119.69	2.80	2.40	1070.97
07-10-2011	20:00:00	49.61	175.00	0.76	0.90	119.70	2.70	2.40	1081.02
07-10-2011	20:05:00	49.69	175.60	0.76	0.90	120.24	2.70	2.50	1091.1
07-10-2011	20:10:00	49.61	175.20	0.76	0.90	119.70	2.70	2.40	1101.16
07-10-2011	20:15:00	49.62	175.70	0.77	0.90	121.49	2.70	2.40	1111.26
07-10-2011	20:20:00	49.61	175.70	0.77	0.90	121.49	2.70	2.40	1121.35
07-10-2011	20:25:00	49.57	175.70	0.77	0.90	121.22	2.70	2.40	1131.46
07-10-2011	20:30:00	49.62	176.30	0.77	0.90	121.77	2.70	2.40	1141.61
07-10-2011	20:35:00	49.59	176.30	0.77	0.90	121.63	2.70	2.40	1151.77
07-10-2011	20:40:00	49.57	176.30	0.77	0.90	121.50	2.70	2.40	1161.92
07-10-2011	20:45:00	49.57	177.10	0.77	0.89	121.91	2.70	2.40	1172.16
07-10-2011	20:50:00	49.64	177.80	0.77	0.89	122.39	2.70	2.50	1182.45
07-10-2011	20:55:00	49.79	179.00	0.77	0.90	123.63	2.70	2.50	1192.83
07-10-2011	21:00:00	49.86	178.90	0.77	0.90	123.84	2.70	2.50	1203.17
07-10-2011	21:05:00	49.71	178.10	0.77	0.90	122.87	2.70	2.50	1213.48
07-10-2011	21:10:00	49.64	177.70	0.77	0.89	122.33	2.70	2.50	1223.76
07-10-2011	21:15:00	49.68	178.10	0.77	0.90	122.74	2.70	2.50	1234.06
07-10-2011	21:20:00	49.63	177.90	0.77	0.89	122.46	2.70	2.50	1244.37
07-10-2011	21:25:00	49.70	179.10	0.78	0.89	124.89	2.70	2.50	1254.78
07-10-2011	21:30:00	49.65	178.90	0.78	0.89	124.61	2.70	2.50	1265.18
07-10-2011	21:35:00	49.67	179.50	0.78	0.89	124.89	2.70	2.50	1275.63
07-10-2011	21:40:00	49.79	181.10	0.78	0.89	126.28	2.70	2.60	1286.22
07-10-2011	21:45:00	49.85	181.60	0.78	0.90	126.77	2.70	2.60	1296.85
07-10-2011	21:50:00	49.80	181.20	0.78	0.89	126.35	2.70	2.50	1307.45
07-10-2011	21:55:00	49.83	182.30	0.79	0.89	128.61	2.70	2.50	1318.15
07-10-2011	22:00:00	49.72	181.60	0.79	0.89	127.83	2.70	2.50	1328.81
07-10-2011	22:05:00	49.62	180.70	0.79	0.89	126.91	2.70	2.60	1339.4
07-10-2011	22:10:00	49.63	180.90	0.79	0.89	127.05	2.70	2.60	1350.02
07-10-2011	22:15:00	49.63	181.20	0.79	0.89	127.12	2.70	2.60	1360.67
07-10-2011	22:20:00	49.77	182.10	0.79	0.89	128.18	2.70	2.60	1371.37
07-10-2011	22:25:00	49.76	182.80	0.79	0.89	128.53	2.70	2.60	1382.16
07-10-2011	22:30:00	49.70	182.50	0.80	0.89	129.79	2.70	2.70	1392.93
07-10-2011	22:35:00	49.68	182.50	0.79	0.89	128.03	2.70	2.70	1403.71
07-10-2011	22:40:00	49.75	183.30	0.80	0.89	130.36	2.70	2.70	1414.54
07-10-2011	22:45:00	49.68	183.30	0.80	0.89	130.07	2.70	2.70	1425.41
07-10-2011	22:50:00	49.63	183.10	0.80	0.89	129.78	2.80	2.70	1436.27
07-10-2011	22:55:00	49.64	183.20	0.80	0.89	129.85	2.80	2.70	1447.13

contd..



Date	Time	Hz	V	A	PF	W	VTHD	ATHD	Wh
07-10-2011	23:00:00	49.57	182.80	0.80	0.89	129.42	2.80	2.70	1457.97
07-10-2011	23:05:00	49.52	182.50	0.80	0.88	128.92	2.80	2.70	1468.8
07-10-2011	23:10:00	49.52	183.00	0.81	0.88	130.74	2.80	2.70	1479.67
07-10-2011	23:15:00	49.61	183.50	0.80	0.89	129.92	2.80	2.70	1490.58
07-10-2011	23:20:00	49.68	184.00	0.80	0.89	130.42	2.80	2.70	1501.52
07-10-2011	23:25:00	49.74	184.50	0.80	0.89	130.92	2.70	2.70	1512.5
07-10-2011	23:30:00	49.74	184.70	0.80	0.89	131.06	2.70	2.70	1523.5
07-10-2011	23:35:00	49.73	184.30	0.80	0.89	130.93	2.70	2.70	1534.47
07-10-2011	23:40:00	49.73	184.30	0.80	0.89	130.78	2.80	2.70	1545.43
07-10-2011	23:45:00	49.72	184.10	0.80	0.89	130.78	2.80	2.70	1556.37
07-10-2011	23:50:00	49.67	183.70	0.80	0.89	130.21	2.80	2.70	1567.29
07-10-2011	23:55:00	49.78	184.70	0.80	0.89	131.21	2.80	2.70	1578.28
08-10-2011	00:00:00	49.79	185.00	0.80	0.89	131.57	2.80	2.70	1589.3
08-10-2011	00:05:00	49.42	182.30	0.81	0.88	130.09	2.80	2.70	1600.14
08-10-2011	00:10:00	49.52	182.60	0.80	0.88	128.99	2.80	2.70	1610.97
08-10-2011	00:15:00	49.62	183.50	0.80	0.89	129.92	2.80	2.70	1621.87
08-10-2011	00:20:00	49.51	182.50	0.80	0.88	128.92	2.80	2.70	1632.7
08-10-2011	00:25:00	49.55	182.60	0.80	0.88	129.13	2.80	2.70	1643.52
08-10-2011	00:30:00	49.50	182.20	0.80	0.88	128.71	2.80	2.70	1654.32
08-10-2011	00:35:00	49.47	182.20	0.80	0.88	128.56	2.80	2.70	1665.12
08-10-2011	00:40:00	49.57	182.80	0.80	0.88	129.28	2.80	2.70	1675.95
08-10-2011	00:45:00	49.59	182.90	0.80	0.88	129.35	2.80	2.70	1686.8
08-10-2011	00:50:00	49.58	182.80	0.80	0.88	129.28	2.80	2.70	1697.63
08-10-2011	00:55:00	49.55	182.80	0.80	0.88	129.13	2.80	2.70	1708.48
08-10-2011	01:00:00	49.57	183.00	0.80	0.88	129.42	2.80	2.70	1719.34
08-10-2011	01:05:00	49.56	183.00	0.80	0.88	129.27	2.80	2.70	1730.2
08-10-2011	01:10:00	49.53	182.70	0.80	0.88	129.06	2.80	2.70	1741.03
08-10-2011	01:15:00	49.45	182.20	0.81	0.88	130.02	2.80	2.70	1751.84
08-10-2011	01:20:00	49.50	182.60	0.81	0.88	130.45	2.80	2.70	1762.67
08-10-2011	01:25:00	49.54	183.00	0.81	0.88	130.89	2.80	2.70	1773.54
08-10-2011	01:30:00	49.49	182.60	0.81	0.88	130.45	2.80	2.70	1784.37
08-10-2011	01:35:00	49.49	182.70	0.81	0.88	130.38	2.80	2.70	1795.21
08-10-2011	01:40:00	49.51	183.10	0.81	0.88	130.81	2.80	2.70	1806.09
08-10-2011	01:45:00	49.48	183.00	0.81	0.88	130.59	2.80	2.70	1816.97
08-10-2011	01:50:00	49.49	183.10	0.81	0.88	130.66	2.80	2.70	1827.86
08-10-2011	01:55:00	49.55	183.70	0.81	0.88	131.24	2.80	2.70	1838.79
08-10-2011	02:00:00	49.63	184.60	0.81	0.88	132.03	2.80	2.70	1849.8
08-10-2011	02:05:00	49.54	184.00	0.81	0.88	131.30	2.80	2.70	1860.78
08-10-2011	02:10:00	49.52	184.00	0.81	0.88	131.30	2.80	2.70	1871.76
08-10-2011	02:15:00	49.62	184.80	0.81	0.88	132.17	2.80	2.70	1882.8
08-10-2011	02:20:00	49.60	184.90	0.81	0.88	132.10	2.80	2.80	1893.86
08-10-2011	02:25:00	49.59	184.80	0.81	0.88	132.02	2.80	2.80	1904.91
08-10-2011	02:30:00	49.63	185.10	0.81	0.88	132.39	2.80	2.70	1915.99
08-10-2011	02:35:00	49.58	184.70	0.81	0.88	131.95	2.80	2.70	1927.04
08-10-2011	02:40:00	49.47	183.90	0.81	0.88	130.93	2.80	2.70	1938.02
08-10-2011	02:45:00	49.54	184.50	0.81	0.88	131.66	2.80	2.80	1949.06
08-10-2011	02:50:00	49.58	184.90	0.81	0.88	132.10	2.80	2.80	1960.12
08-10-2011	02:55:00	49.63	185.30	0.81	0.88	132.53	2.80	2.80	1971.21
08-10-2011	03:00:00	49.71	186.00	0.81	0.88	133.18	2.80	2.80	1982.36

